Journal of the Royal Society of Arts

NO. 4980 FRIDAY, 22ND JUNE, 1956 VOL. CIV

FORTHCOMING MEETINGS

TUESDAY, 3RD JULY, at 2.30 p.m. '*Peaty Terrain: its influence as a factor controlling development in Great Britain and Canada*', by Norman W. Radforth, M.A., Ph.D., Professor of Botany, McMaster University, Ontario. (The paper will be illustrated with a film and lantern slides.) Sir John Simonsen, D.Sc., F.R.I.C., F.R.S., a Member of Council of the Society, will preside.

WEDNESDAY, 4TH JULY, at 3 p.m. Annual General Meeting (see Notice below). Tea will be served afterwards.

ANNUAL GENERAL MEETING

The Council hereby gives notice that, in accordance with the Bye-Laws, the Two Hundred and Second Annual General Meeting, for the purpose of receiving the Council's Report and the Financial Statements for 1955, and the election of officers, will be held on Wednesday, 4th July, 1956, at 3 p.m., at the Society's House.

(By Order of the Council)
KENNETH WILLIAM LUCKHURST, *Secretary.*

MEETING OF COUNCIL

A meeting of Council was held on Monday, 11th June, 1956. Present: Mr. E. Munro Runtz (in the Chair); Mrs. Mary Adams; Dr. W. Greenhouse Allt; Sir Alfred Bossom; Sir Edward Crowe; Mr. P. A. Le Neve Foster; Mr. John Gloag; Sir Ernest Goodale; The Earl of Halsbury; Mr. A. C. Hartley; Sir Harry Lindsay: Mr. F. A. Mercer; Mr. O. P. Milne; Lord Nathan; Sir Albert Richardson; Mr. A. R. N. Roberts; Sir Harold Saunders; Sir Selwyn Selwyn-Clarke; Sir John Simonsen and Sir Stephen Tallents; with Mr. K. W. Luckhurst (Secretary); Mr. R. V. C. Cleveland-Stevens (Deputy Secretary) and Mr. David Lea (Assistant Secretary).

ELECTIONS

The following candidates were duly elected Fellows of the Society:

Adams, Robert, Clydebank, Lanarkshire.
Bowl, Douglas Pollok, F.R.I.C.S., Horley, Surrey.
Boyce, William S., M.S.I.A., London.
Butler, Maurice, F.C.I.I., Watford, Herts.
Busfield, Mrs. Marjorie, Harrogate, Yorks.
Cox, Richard George, F.R.I.B.A., Olton, Warwicks.

Daines, The Rev. Norman Steele, Brighton, Sussex.
Denvir, Bernard, Bethersden, Kent.
Dunlop, Professor George Murray, M.A., Ph.D., Edmonton, Alberta, Canada.
Dyde, Mrs. Dorothy R., M.A., Edmonton, Alberta, Canada.
Focken, Charles Melbourne, B.Sc., M.S., D.Phil., Kew, Victoria, Australia.
Harding-Green, Gilbert Henry, Willingale, Essex.
Hellberg, Rolf, F.R.I.B.A., Coventry, Warwicks.
Hussain, Mumtaz, B.Sc., M.R.C.S., L.R.C.P., London.
Knight, David Anthony, London.
McArton, Arthur William, M.Sc., Calgary, Alberta, Canada.
McCallum, William, F.I.B.P., F.R.P.S., Ayr, Ayrshire.
McNamara, Thomas Francis, B.A., M.R.I.A.I., Cork, Ireland.
Newbold, Leo, Wallington, Surrey.
Petts, Ronald John, Cardiff, Glamorgan.
Richmond, Douglas Arthur Robert, A.T.D., Barnet, Herts.
Sheppard, Ross S., M.A., M.Ed., Edmonton, Alberta, Canada.
Simpkin, Arnold Frewen, M.A., B.Sc., Bramcote, Notts.
Smithers, Kenneth Oswald, M.A., Stockton-on-Tees, Co. Durham.
Streeter, Joseph Clifford, Reigate, Surrey.
Tait, Frank Morrison, D.Sc., Dayton, Ohio, U.S.A.
Taylor, Laurance Arthur, Hythe, Kent.
Thurston, Arthur Reginald, A.T.D., Cambridge.
Turner, Mrs. Anne McAllister, Hawarden, Cheshire.
Vigers, Brian Edmund Allen, M.A., A.M.I.C.E., Luton, Beds.
Weir, John Robert, B.S.A., M.Sc., Ph.D., Winnipeg, Manitoba, Canada.
Williams, Emlyn, London.
Yakan, Wafik Ramsie, Surbiton, Surrey.

The following was duly elected an Associate Member as a winner of an Industrial Art Bursary in 1955:

Stern, Miss Hanna, London.

'BEAUTY IN DANGER'

It was decided to call a Conference in the late autumn of representatives of the various bodies concerned, to consider ways of safeguarding the amenities of town and countryside.

GIFTS TO THE SOCIETY

A gift by Lord Nathan of nine volumes of the series *Survey of World Textiles*, and the offer by Miss Susie Cooper, R.D.I., of a tea service for use in the Council Room, were gratefully accepted.

SOCIETY OF CHEMICAL INDUSTRY

An invitation to the Society to appoint a representative at the 75th Anniversary celebrations of the Society of Chemical Industry was accepted and it was decided that an Address of Congratulation should be presented.

ROYAL ACADEMY WINTER EXHIBITION

It was agreed to loan to the Royal Academy for this Exhibition one of the James Barry pen-and-ink self-portraits in the possession of the Society.

EXAMINATIONS

It was reported that the entries for the summer series of examinations totalled 96,824, as compared with 87,769 in 1955.

OTHER BUSINESS

A quantity of financial and other business was transacted.

FINANCIAL STATEMENTS FOR 1955

The following statements are published in accordance with Section 25 of the Society's Bye-laws

BALANCE SHEET, 31st December, 1955

1954 £		£	£
	General Fund Accounts—		
97,695	General Purposes Capital Account per annexed account (page 563)	99,507	
6,008	Dr. Cantor's Bequest	6,008	
2,548	Lord Bennett's Bequest	2,548	
7,468	Henry Morley's Bequest	7,468	
2,163	Dorothy Corfield's Bequest	2,163	
—	J. A. Milne's Bequest	500	
	Life Composition Account (page 563) :		
11,933	Unexpired balance of compositions received on the basis of taking credit for such compositions over a period of 12 years from their receipt	11,771	
127,815			129,965
	Specific Fund Accounts (page 563)—		
10,495	Amount accumulated towards pensions payable under Modified Superannuation Scheme	10,178	
1,564	Provision for Rehabilitation of Building, including £500 gift in memory of the late Lord Amulree ...	1,524	
244	Industrial Art Bursaries Fund Account	201	
12,303			11,903
	Liabilities—		
7,705	Creditors	8,218	
3,637	Industrial Art Bursaries awarded (but not expended) ...	4,070	
13	Preservation of Ancient Cottages Fund	16	
	Uninvested Trust Capital :		
1	Cadman Memorial Fund	1	
259	Dr. Swiney's Bequest	259	
1,647	Unexpended Trust Income *less* Income over-expended (page 565)	2,024	
61	Contributions received for Industrial Art Bursaries to be awarded in 1956	200	
13,323			14,788
153,441	Carried forward		156,656

	£	£	1954 £
General and Specific Fund Assets—			
Freehold Property, 6/8 John Adam Street			
Cost in 1922, plus additions, *less* sales and compensation received		49,788	*49,788*
Pictures, Books, Furniture and Fixtures (as fixed in 1919)		10,000	*10,000*
Investments :			
Freehold Ground Rents, at cost	3,245		*3,641*
Securities (page 564) :			
General (Market Value £35,380—1954 £40,945)	41,684		*41,684*
Dr. Cantor's Bequest (Market Value £4,990—1954 £5,804)	5,941		*5,941*
Lord Bennett's Bequest (Market Value £2,139—1954 £2,489)	2,548		*2,548*
Henry Morley's Bequest (Market Value £6,272—1954 £7,295)	7,468		*7,468*
Dorothy Corfield's Bequest (Market Value £1,780—1954 £2,070)	2,119		*2,119*
J. A. Milne's Bequest (Market Value £497)	500		—
Held towards meeting pensions payable under Modified Superannuation Scheme (Market Value £7,253—1954 £8,260)	8,238		*8,238*
Fund for Rehabilitation of Building (Market Value £2,037—1954 £2,400)	2,500		*2,500*
		74,243	*74,139*
		134,031	*133,927*
Stocks of Stationery and Working Papers of Examinations Department at value estimated by the Society's printer	3,301		*3,002*
Stock of "History of the R.S.A." at cost, less sales ...	—		*2,772*
Debtors and Payments in Advance	4,172		*5,914*
Balances with Bankers and Cash in Hand	15,152		*7,826*
		22,625	*19,514*
Carried forward		156,656	*153,441*

BALANCE SHEET, 31st December, 1955—*continued.*

1954				*1954*			
£		£	£	£		£	£
153,441	Brought forward		156,656	*153,441*	Brought forward	156,656	
	Trust Fund Accounts—				**Trust Fund Assets—**		
27,039	Capital Account : Balance at 31st December, 1954 ...	30,339			Capital : Investments (page 564) :		
1,798	*Add : Receipts in respect of the Thomas Gray Trust* ...	—			Freehold Ground Rents, at cost ... 1,716		*1,716*
1,000	*Fred Cook Memorial Fund*	—			Securities (Market Value £24,879—1954 £28,862) 28,363		*28,363*
422	*Profits less losses on sale of investments*	—					
80	*Profit on Sale of Freehold Ground Rents* ...	—			30,079		*30,079*
30,339		30,339			Uninvested Funds 260		*260*
1,647	Unexpended Income (net)	2,024			30,339		*30,339*
31,986			32,363		Income due from the Society 2,024		*1,647*
						32,363	*31,986*

Notes :

(1) Credit has been taken for the whole of the subscriptions received during the year, although some relate to periods expiring after the date of the Balance Sheet, but no credit has been taken for subscriptions due but unpaid at 31st December, 1955.

(2) The balances standing to the credit of the various Fund Accounts are subject to the market value of the relative investments, the majority of which are dated stocks.

On behalf of the Council

ROBT. W. HOLLAND *Chairman.*
PETER A. LE NEVE FOSTER } *Treasurers.*
ALFRED C. BOSSOM }

£185,427		*£189,019*	*£185,427*

Report of the Auditors to the Council and Fellows of the Royal Society of Arts.

We have obtained all the information and explanations which to the best of our knowledge and belief were necessary for the purposes of our audit. In our opinion proper books of account have been kept by the Society so far as appears from our examination of those books. We have examined the above Balance Sheet and annexed Income and Expenditure Account which are in agreement with the books of account. In our opinion and to the best of our information and according to the explanations given us the Balance Sheet gives a true and fair view of the state of the Society's affairs as at 31st December 1955, and the Income and Expenditure Account gives a true and fair view of the income and expenditure for the year ended on that date.

5 London Wall Buildings,
London, E.C.2.
18th June, 1956.

DELOITTE, PLENDER, GRIFFITHS & CO., *Chartered Accountants.*

INCOME AND EXPENDITURE ACCOUNT

for the Year ended 31st December, 1955

EXPENDITURE

1954			
£		£	£
	Printing and Publishing *Journal*—		
6,152	Printing and Paper	6,203	
1,107	Postages...	975	
250	Reviews, Shorthand Reports and other expenses ...	209	
7,509			7,387
1,642	Library—Salaries, Books, etc.		1,680
119	Cost of Albert and Society's Medals and R.D.I. Expenses		345
	Industrial Art Bursaries—		
200	Contribution to Fund	200	
310	Expenses of Competition	214	
510			414
135	Cantor and Morley Lectures		255
	Examination Expenses—		
11,010	Examiners' Fees	12,461	
6,822	Stationery and Printing	8,608	
6,274	Other Expenses	6,229	
13,273	Proportion of Salaries as below	14,661	
391	Proportion of House and Office Expenses as below	423	
37,770			42,382
47,685	Carried forward		52,468

INCOME

1954				
£		£	£	£
16,629	Annual Subscriptions received during year		17,144	16,629
1,180	Registration Fees		777	1,180
1,877	One-twelfth of Life Compositions received during twelve years to date		1,930	1,877
35	*Donations*		—	35
	Income from—			
153	Ground Rents	126		153
833	General Fund Investments	1,525		833
155	Dr. Cantor's Bequest	212		155
77	Lord Bennett's Bequest	91		77
261	Henry Morley's Bequest	266		261
69	Dorothy Corfield's Bequest	76		69
—	J. A. Milne's Bequest	—		—
265	Trust Funds for General Purposes	258		265
297	Bank and Deposit Accounts...	70		297
2,110			2,624	2,110
898	Sales of *Journal*, etc.	672		898
1,844	Advertisements in *Journal*	1,439		1,844
2,742			2,111	2,742
39,671	Examination Fees	45,813		39,671
2,511	Sales of Examination Papers and Advertisements ...	2,822		2,511
42,182			48,635	42,182
413	Rents Receivable		411	413
67,168	Carried forward		73,632	67,168

1954		£	£
£			
47,685	Brought forward		52,463
22,408	Salaries, Wages and Superannuation Scheme	25,837	
13,273	*Less:* Proportion estimated to be applicable to Examinations above	14,661	
9,135			11,176
	House and Office Expenses—		
1,044	Rates and Insurance	916	
190	Repairs, Renewals and Decorations	6	
1,153	Lighting, Heating, Cleaning, Expenses of Meetings and General Charges	948	
1,525	Stationery, Printing, Postages, Telephone, Audit and Accountancy and other Office Expenses ...	2,360	
3,912		4,230	
391	*Less:* Proportion (10 per cent.) allocated to Examinations above	423	
3,521			3,807
1,616	Pensions	1,350	
744	*Less:* Charged against Modified Superannuation Scheme Fund Account	611	
872			739
3,681	Bicentenary Celebration Expenses		1,585
2,274	Excess of Income over Expenditure carried to General Purposes Capital Account		3,862
£67,168			£73,632

1954		£	£
£			
67,168	Brought forward		73,632
			£73,632

GENERAL PURPOSES CAPITAL ACCOUNT

for the Year ended 31st December, 1955

1954		£
—	Stock of "History of the R.S.A." written off	2,729
622	*Losses less Profits on sale of investments*	—
97,695	Balance per Balance Sheet	99,507
	(N.B.—Provision has not been made for War Damage Repairs still outstanding nor credit taken for further amounts recoverable from the War Damage Commission.)	
£98,317		£102,236

	£	1954 £
Balance at 31st December, 1954 ...	97,695	95,554
Repairs recovered from the War Damage Commission	308	31
Proceeds of Sale of Books from Library	42	[illegible]
Profit on Sale of Freehold Ground Rents	129	454
Legacy from Lt. Col. P. J. Cowan	200	—
Excess of Income over Expenditure per foregoing account	3,862	2,274
	£102,236	£98,317

LIFE COMPOSITION ACCOUNT for the Year ended 31st December, 1955

1954		£
	Amount taken into the Society's Income—	
1,877	One-twelfth of Compositions received during twelve years to date	1,930
11,933	Balance per Balance Sheet	11,771
£13,810		£13,701

	£	1954 £
Balance at 31st December, 1954 ...	11,933	10,679
Compositions received during year ...	1,768	3,131
	£13,701	£13,810

SPECIFIC FUND ACCOUNTS for the Year ended 31st December, 1955

1954		£
	Amount accumulated towards pensions payable under Modified Superannuation Scheme—	
£		£
10,836	Balance at 31st December, 1954 ...	10,495
359	*Add :* Interest on Investments ...	294
44	*Profit on redemption of Investment*	—
11,239		10,789
744	*Deduct :* Proportion of Pensions paid during year ...	611
£10,495		£10,178
	Provision for Rehabilitation of Building—	
£		£
2,692	Balance at 31st December, 1954 ...	1,564
75	*Add :* Interest on Investment ...	75
2,767		1,639
1,203	*Deduct :* Repairs and Renewals (including War Damage) charged against Fund...	115
£1,564		£1,524

		£	1954 £
Industrial Art Bursaries Fund Account—			
Balance at 31st December, 1954 ...		244	202
Add : Contributions received ...		2,132	2,292
Appropriation from Art Congress Studentship ...		—	50
		2,376	2,544
Deduct : Bursaries awarded for 1955 ...	... £2,375	[illegible]	2,500
Cost of pamphlets and other Expenses	214		310
	2,589		2,810
Less : charged against Income and Expenditure Account	414		510
		2,175	2,300
		£201	£244

INVESTMENTS

31st December, 1955

	Cost £
Society	
£5,000 British Transport 3 per cent. Stock 1978/88	4,820
£10,000 3½ per cent. Conversion Stock 1969	10,189
£20,000 British Electricity 4½ per cent. Stock 1974/79	21,871
£7,000 2½ per cent. Consolidated Stock	4,804
	£41,684
Dr. Cantor's Bequest	Cost
£6,048 3½ per cent. Funding Stock 1999/2004	£5,941
Lord Bennett's Bequest	Cost
£2,593 3½ per cent. Funding Stock 1999/2004	£2,548
Henry Morley's Bequest	Cost
£7,603 3½ per cent. Funding Stock 1999/2004	£7,468
Dorothy Corfield's Bequest	Cost
£2,157 3½ per cent. Funding Stock 1999/2004	£2,119
J. A. Milne's Bequest	Cost
£609 3½ per cent. Funding Stock 1999/2004	£500
Modified Superannuation Scheme	Cost
£4,709 4 per cent. Funding Stock 1960/90	£4,709
£1,536 3 per cent. Funding Stock 1959/69	1,529
£2,000 3 per cent. Savings Bonds 1960/70	2,000
	£8,238
Fund for Rehabilitation of Building	Cost
£2,500 3 per cent. Savings Bonds 1960/70	£2,500

Trust Funds	Cost or value when received in trust	
Dr. Aldred Trust.		
£142 3½ per cent. Funding Stock 1999/2004		£140
Art Congress Studentship.		
£1,495 3½ per cent. Funding Stock 1999/2004		1,469
R. B. Bennett Empire Prize Trust.		
£1,463 3½ per cent. Funding Stock 1999/2004		1,437
Sir George Birdwood Memorial Fund.		
£678 3½ per cent. Funding Stock 1999/2004		666
Selwyn Brinton Trust.		
£1,013 3½ per cent. Funding Stock 1999/2004		995
Alfred Davies Bequest.		
£1,988 3½ per cent. Funding Stock 1999/2004		1,953
Le Neve Foster Trust.		
£372 3½ per cent. Funding Stock 1999/2004		365
John Fothergill Trust.		
£251 3½ per cent. Funding Stock 1999/2004		247
Thomas Gray Memorial Trust.		
£9,048 3½ per cent. Conversion Stock 1961 or after	£7,000	
£1,174 3½ per cent. War Stock 1952 or after	995	
£212 British Transport 3 per cent. 1978/88	179	
£663 3½ per cent. Funding Stock 1999/2004	651	
		8,825
Howard Trust.		
£472 3½ per cent. Funding Stock 1999/2004		463
Owen Jones Memorial Trust.		
£480 3½ per cent. Funding Stock 1999/2004		472
Neil Matheson McWharrie Trust.		
£338 3½ per cent. Funding Stock 1999/2004		332
Dr. Mann Trust.		
£949 3½ per cent. Funding Stock 1999/2004		932
Mulready Trust.		
£102 3½ per cent. Funding Stock 1999/2004		100
North London Exhibition Trust.		
£135 3½ per cent. War Stock 1952 or after		185
Sir William J. Pope Memorial Fund.		
£345 3½ per cent. Funding Stock 1999/2004		339
Russian Embassy Prize.		
£92 3½ per cent. Funding Stock 1999/2004		91
Benjamin Shaw Trust.		
£86 3½ per cent. Funding Stock 1999/2004		85
John Stock Trust		
£64 3½ per cent. Funding Stock 1999/2004		63
Dr. Swiney's Bequest.		
Freehold Ground Rents	£1,716	
£4,461 3½ per cent. Funding Stock 1999/2004	4,382	
		6,098

INVESTMENTS—*continued*

Trueman Wood Lecture Endowment Fund.	
£860 3½ per cent. Funding Stock 1999/2004	£845
Cadman Memorial Fund.	
£358 3½ per cent. Funding Stock 1999/2004	351
Thomas Holland Trust.	
£414 3½ per cent. Funding Stock, 1999/2004	406
E. Frankland Armstrong Trust.	
£527 3½ per cent. Funding Stock 1999/2004	518
Joseph Paxton Memorial Trust.	
£1,147 3½ per cent. Funding Stock 1999/2004	1,127
A. C. Bossom Lecture Endowment Fund.	
£585 3½ per cent. Funding Stock 1999/2004	575
Fred Cook Memorial Lecture Fund.	
£1,008 3½ per cent. Funding Stock 1999/2004	1,000
	£30,079

TRUST INCOME AND EXPENDITURE

for the year ended 31st December, 1955

	Unexpended Income 1st Jan. 1955.	Income received during year.	Expenditure on lectures, prizes and adminis-tration.	Amount applied to Society's General Purposes.	Unexpended Income carried forward 31st Dec. 1955.
	£	£	£	£	£
Dr. Aldred Trust	15	5	—	—	20
Art Congress Studentship	161	52	5	—	208
R. B. Bennett Empire Prize Trust	135	51	107	—	79
Sir George Birdwood Memorial Fund	157	24	32	—	149
Selwyn Brinton Trust	259	35	2	—	292
Alfred Davies Bequest	—	70	—	70	—
Le Neve Foster Trust	4	13	12	—	5
John Fothergill Trust	67	9	21	—	55
Thomas Gray Memorial Trust	83	738	436	—	385
Howard Trust	167	17	51	—	133
Owen Jones Memorial Trust	101	17	—	—	118
Neil Matheson McWharrie Trust	5	12	1	—	16
Dr. Mann Trust	*Dr.* 33	33	31	—	*Dr.* 31
Mulready Trust	14	3	—	3	14
North London Exhibition Trust	92	5	—	—	97
Sir William J. Pope Memorial Fund	30	12	16	—	26
Russian Embassy Prize	51	3	6	—	48
Benjamin Shaw Trust	12	3	20	—	*Dr.* 5
John Stock Trust	50	3	—	—	53
Dr. Swiney's Bequest	40	225	—	185	80
Trueman Wood Lecture Endowment Fund	9	30	33	—	6
Cadman Memorial Fund	38	13	16	—	35
Thomas Holland Trust	29	14	15	—	28
E. Frankland Armstrong Trust	30	18	26	—	22
Joseph Paxton Memorial Trust	111	40	2	—	149
A. C. Bossom Lecture Endowment Fund	20	20	31	—	9
Fred Cook Memorial Lecture Fund	—	35	2	—	33
	1,680	£1,500	£865	£258	2,060
	Dr. 33	—	—	—	*Dr.* 36
	£1,647				£2,024

PRESERVATION OF ANCIENT COTTAGES FUND. INCOME AND EXPENDITURE ACCOUNT for the year ended 31st December, 1955

1954			1954		
£		£	£		£
9	Insurance, etc.	8		Interest on Investment	25	36
639	Repairs to National Trust Cottages at Chiddingstone, Kent	134		Rents receivable	28	28
				Excess of Expenditure over Income transferred to Capital Account	89	584
£648		£142			£142	£648

BALANCE SHEET, 31st December, 1955

1954					1954	
£		£	£	£	£	£
	Capital Account—					
2,963	Balance at 31st December, 1954...		2,315		Cottages at Drayton St. Leonard (James Cranstoun Bequest) as fixed in 1932	1,000	1,000
584	*Deduct :* Excess of Expenditure over Income as above ...	89			£556 Agricultural Mortgage Corporation Ltd. 4½% Debenture Stock, 1961/91, (James Cranstoun Bequest) at cost (Market Value £504 —1954 £565)	541	541
—	Cost of installing water mains to cottages at Drayton St. Leonard ...	61					
32	*Loss on sale of investments* ...	—			Debtors :		
32	*Capital Redemption of Land Tax*	—			Royal Society of Arts ... £16		13
					Income Tax recoverable, etc. 13		14
648		——	150			29	
					Balance with Bankers	595	747
2,315	Balance at 31st December, 1955 (including James Cranstoun Bequest £2,133)		——	2,165			
	PETER A. LE NEVE FOSTER ALFRED C. BOSSOM } *Treasurers.*						
£2,315				£2,165		£2,165	£2,315

Report of the Auditors to the Council and Fellows of the Royal Society of Arts.

We have obtained all the information and explanations which to the best of our knowledge and belief were necessary for the purposes of our audit. In our opinion proper books of account have been kept by the Fund so far as appears from our examination of those books. We have examined the above Balance Sheet and Income and Expenditure Account which are in agreement with the books of account. In our opinion and to the best of our information and according to the explanations given us the Balance Sheet gives a true and fair view of the state of the Fund's affairs as at 31st December, 1955 and the Income and Expenditure Account gives a true and fair view of the income and expenditure for the year ended on that date.

5, London Wall Buildings,
London, E.C.2.

18th June, 1956. DELIOTTE, PLENDER, GRIFFITHS & CO., *Chartered Accountants.*

THE TOURIST INDUSTRY

A paper by

J. G. BRIDGES, O.B.E., F.R.G.S.,

Director-General, British Travel and Holidays Association, read to the Society on Wednesday, 14th March, 1956, with Sir John Elliot, M.Inst.T., Chairman, London Transport Executive, in the Chair

THE CHAIRMAN: If I may say so, with great respect to this famous and ancient Society, it is about time that tourism, with the importance it has now attained in our economy, and in our lives, should be the subject of a discussion in this famous room. I am very glad therefore that the Royal Society of Arts has given the industry the opportunity this afternoon of a discussion.

When I was asked to preside I was very happy to do so for two reasons, first because I have known Mr. Bridges ever since he became what he is, the heart and soul of the Association which he so ably directs (and anything that we can do to help him in his task we should all jump to do) and secondly, for the personal reason that it has fallen to my lot during thirty years or so to be connected with what used to be called the 'Come to Britain' movement.

I well remember the first meeting that Sir Francis Towle called, I think in the Northumberland or old Victoria Hotel with the litter of Clifford Whitley's 'Midnight Follies' to cheer us on. The 'Come to Britain' movement was launched, it floundered and it has had various vicissitudes as you will hear from Mr. Bridges. You will hear from him too how it survived, and grew and what it is now.

The following paper, which was illustrated with a film, was then read:

THE PAPER

When I looked through the *Journal* of this ancient and influential Society, and read there the names of its Council members, I must confess that I felt I should be happier in the audience than as the lecturer. It would be hard to find a more representative list of distinguished men and women, all of whom are leaders in their own particular field. Reference to the list of previous lecturers only tended to increase my feelings of inadequacy and I might add that this has not been diminished by the presence in the audience of so many experts from different branches of the tourist industry.

I was greatly encouraged when I learned that my good friend Sir John Elliot had very kindly consented to preside. Sir John's long and distinguished career in transport and his close connection with the work of the British Travel and Holidays Association certainly make him a most appropriate chairman for this meeting. I would like him to know how deeply I appreciate his undertaking this duty in view of the very many other demands which are made upon his time.

So far as I can discover, this is the first time in the long history of the Royal Society for the Encouragement of Arts, Manufactures and Commerce, that the tourist industry has featured as a subject for discussion, and I am grateful to the Council of the Society for giving me the opportunity of speaking on this subject.

Perhaps, at the outset, I should say something about the British Travel and Holidays Association, of which I am the Chief Executive Officer. The Association was formed in 1929 by a few far-seeing enthusiasts from the transport and hotel industries. It was known as the Travel and Industrial Development Association of Great Britain and Ireland, and it struggled valiantly, with very little support from either Government or the industries it sought to serve, to develop the 'Come to Britain' campaign. In those early days, and indeed to some extent even to-day, it was not considered very respectable for a great nation like Britain to engage in the business of tourism. The British people have never really been very interested in the tourist business. Our position as an island nation with great wealth and investments overseas has tended to make us keener on travelling abroad than on attracting travellers to visit us. The losses consequent upon two world wars, however, have changed our economic position. New sources of income have had to be found to enable us to pay for the imports of food and raw materials on which our very existence depends. One of the greatest of these sources, as I shall try to illustrate, is the income in the form of 'invisible exports' engendered by the tourist industry.

The Travel Association, which had been placed on a 'care and maintenance' basis from 1939, came into action again in 1945. In 1946 the Government set up a new grant-aided body to foster and develop the tourist, catering and holiday services. This body, the British Tourist and Holidays Board, was to have wider functions than the existing Travel Association, which then became the Tourist Division of the new Board.

In 1950 the British Travel and Holidays Association was formed by the merger of the Board with the Travel Association. The new body was charged with carrying out the work of both its predecessors and it is the Government's chosen instrument for tourist publicity and propaganda overseas, as well as having a general interest in the development of holiday services within our own country. Although most of its finance comes from a grant-in-aid carried on the vote of the Board of Trade, the Association is, nevertheless, a voluntary organization with subscribing members. Its affairs are directed by an unpaid Board of 23 members, widely representative of the tourist industry and certain consumer interests. Since it has no statutory powers, its success depends on the co-operation, interest and enthusiasm of its members and the public.

The tourist industry can truly be said to be unique in that it affects the life of nearly every human being in a greater or lesser degree at some time. It is difficult to define, because it involves so many widely different interests, as many and varied, indeed, as man's wants. Every trade that supplies goods or services to the traveller or overseas visitor is part of the industry with which we are dealing to-day. I think we must clearly understand that tourist traffic is only part of a much greater movement of people. It is, in fact, that portion of the travel movement which enters into international trade.

I am sure it will be realized that to get a really complete picture we have to consider the whole travel and holiday industry, which serves all travellers, whether from overseas or from another part of our own country. When any

section of this industry is paid for what it supplies in money which is part of another country's national income, then the transaction is an 'export' and is part of tourism. Since I have only a strictly limited space at my disposal, I shall not attempt to deal with the whole travel field as comprehended in the title of my Association, but shall confine my remarks to the side of our work that concerns the tourist or visitor from abroad.

For the purpose of this paper, therefore, we can define the tourist as any person travelling in a country other than that in which he normally resides, and remaining there for not less than 24 hours and for not more than six months in the course of any 12-month period, for legitimate non-immigrant purposes such as touring, recreation, sports, health, family reasons, study, or business.

It is only since the war that Britain has made any serious efforts to build up a tourist industry and, therefore, the measure of success achieved in the relatively short space of a decade is all the more remarkable when one considers the difficulties of the early post-war years, the keen international competition for tourist traffic, and the fact that we, as a nation, had no tourist tradition like, for example, France, Switzerland, and Italy. It is important that the nation as a whole should be alive to the value of the contribution which can be made by the tourist industry to our balance of payments position and to general national prosperity. In Britain to-day, with the exception of those involved in the travel business, there are very few people who realize its importance or the magnitude of its potentialities or of its problems.

TABLE I. VISITORS FROM OVERSEAS AND CURRENCY EARNINGS

Year	*All visitors* (*d*)	*Dollar visitors*	*Total earnings* (*c*) (*f*)	*Dollar earnings* (*c*)	*Total earnings including fare payments* (*e*)
1937 (*a*) ..	491,000	103,000 (*b*)	£31 m.	£5 m. (*b*)	£43 m.
1947 ..	401,000	74,000	£21 m.	£7 m.	£30 m.
1948 ..	511,000	113,000	£33 m.	£12 m.	£47 m.
1949 ..	565,000	147,000	£42 m.	£18 m.	£64 m.
1950 ..	630,000	180,000	£61 m.	£21 m.	£81 m.
1951 ..	712,000	180,000	£75 m.	£23 m.	£103 m.
1952 ..	733,000	221,000	£80 m.	£27 m.	£114·5 m.
1953 ..	819,000	251,000	£88 m.	£31 m.	£126 m.
1954 ..	901,000	275,000	£95 m.	£34 m.	£136 m.
1955 Provisional	1,035,000	310,000	£110 m.	£41 m.	£156 m.

(*a*) Because of Munich, 1938 was not a typical pre-war year for the tourist industry.
(*b*) Figures for Canadians are not available.
(*c*) These figures do not include fare payments to British carriers.
(*d*) Figures include alien visitors arriving *via* Irish Republic.
(*e*) Figures supplied by B.T.H.A.
(*f*) Figures include estimated earnings from visitors from the Irish Republic.

Note : Expenditure of United Kingdom visitors to foreign countries in 1954 was £101 m. (i.e. £6 m. more than the total earnings from visitors to Britain).

TABLE II. REVENUE FROM TOURISM COMPARED WITH CERTAIN OTHER UNITED KINGDOM EXPORTS

	£ million			
	Total		*Dollar area*	
United Kingdom exports:	1954	1955	1954	1955
Machinery (including electrical) ..	579·9	651·8	62·0	66·9
Chemicals	204·5	232·8	20·2	21·9
Private cars	109·0	112·8	18·5	14·5
Woollen and worsted goods ..	83·4	88·8	23·1	26·1
Whisky	39·1	43·6	26·7	27·9
Tourism earnings	95·5	110·0	34·1	39·0

The number of tourists to this country has increased steadily each year since the end of the war. Commencing with just over 400,000 in 1947, contributing some £30 million in foreign currency to the national exchequer, it has risen until, in 1955, it reached an all-time record of over a million visitors and represented foreign currency earnings of some £156 million, including fare payments to British carriers. Figures showing the number of visitors and the currency earned are given in Table I and revenue from tourism compared with certain other United Kingdom exports are set out in Table II. These figures speak for themselves, but in times when dollar earnings are so important, it is significant to note that the *Board of Trade Journal* of 7th January, stated: 'It may be said that in 1954 the tourist industry earned enough dollars to pay for all the tobacco and all the wheat imported from the United States of America'. In the following year, 1955, the statistics showed an increase of some five million dollars on the 1954 figure.

The money spent by tourists within the United Kingdom last year provided a market estimated at £110 million. Who benefited from this considerable expenditure? My answer to that question would be, 'everybody—indirectly'. It is impossible to be accurate on such a wide general question, but my Association estimates that out of every pound spent in this country by overseas visitors roughly 9*s*. went to the hotel and catering industry, 4*s*. to shops, 4*s*. to inland transport, and 3*s*. to entertainments and miscellaneous services. These industries in their turn bought a wide range of goods and gave employment to millions of people.

The Chancellor of the Exchequer reaped a rich harvest, too, from taxes levied on purchases, such as duties on wines and spirits, tobacco, petrol and entertainment (which I would roughly guess at not less than £5 million), to say nothing of expenditure on the post and telegraph services. Fare payments to British shipping and airlines, as can be seen from Table I, amounted to £46 million.

An aspect of tourism that is often overlooked is the financial return it brings to our shops. Last year, this amounted to £22 million and, be it remembered,

the satisfied customer not only buys again, but acts as a most effective salesman for British products in his own country. We can, I think, certainly claim that the tourist industry—itself a vitally important 'invisible' export—brings trade to many other export industries. It brings the customer to the goods instead of, as in the case of other exports, having to send the goods to the customer. The net return to the country is extremely high. Economists emphasize the conversion factor in international trade, referring to the amount of raw material—often imported—required to manufacture most products sent abroad. Tourism is largely a service industry and requires little raw materials or imports to earn its revenue. This is rather strikingly emphasized by the following comment made in an American newspaper about Argentina: 'Argentina has found a better way to sell beef. It is to American tourists, on a plate, at the rate of about a dollar a pound. Shipped to Europe, it brings only 16 cents a pound. So the Argentine is mapping ways to attract more visitors from the U.S.'.

The little known economics of tourism can also, perhaps, be illustrated by the fact that many American visitors, travelling to Britain on a British ship, spend considerably more than £400 in dollars and bring to this country and to British business a sum of money equivalent to the dollars paid for the average British car (discounting the retail and other charges on the sale of the vehicle, which do not revert to Britain).

Tourist and holiday resorts are often among the most prosperous towns in the country. This is due largely to the high rate of tourist spending and the turnover of expenditure in tourist trades, which introduce large sums of extra money into the local community. Such a powerful stimulus brings prosperity to the areas and to almost every section of the business community. The prosperity of these towns could be further improved by the extension of the tourist and holiday season and by the introduction of suitable attractions in what is normally the off-season. It is no use talking of extending the season and urging people to travel in the spring, the autumn, or the winter months if they find, when they reach their destination, that hotels, entertainments and other services are closed down.

It is obvious that the tourist and holiday movement can bring prosperity to areas lacking in natural resources and can support a range of public utility services far greater than those which the local region could afford without this help. These utility services can become the foundation on which secondary industries may be based and, in turn, they can help to bring back life to the countryside, and to check the drift towards the cities and abroad which has affected many countries so seriously.

Tourism, like advertising, is a difficult industry in which to prove exact results, or to define the extent of the results known to have been achieved. It deals with people of all types and introduces them to a wide range of products and services. It provides an opportunity for advertising our best products on our own doorsteps and, as the tourist traffic includes the wealthiest and most influential sections of communities overseas, new and highly profitable demand is very often created. It is not generally known that hire cars (both self-driven

and chauffeur-driven) for driving around the country earned approximately £2 million in foreign currency during 1955. Here is a first-class example of the value of introducing British products in a personal way to potential buyers, and many an overseas visitor has been so delighted with the performance of his hired British car that he has ordered a new one to be shipped home to him. Incidentally, I would mention that cars used by the car-hire trade have, in many cases, earned three times as many dollars in one tourist season as they would have done had they been sold outright in the American market.

We can claim for the tourist industry (as I have already mentioned) that, in certain instances, no raw material of any kind is needed to provide services for the overseas visitors and, therefore, that tourist receipts are a hundred per cent clear profit. For example, if I have a railway train or a motor-coach running on a regular passenger service and fill what would otherwise be empty seats with a party of tourists, I have made a clear gain without having to spend any extra money to do it. How much is this overseas business worth to British Railways? According to the statisticians, the tourists spent some £11 million on that form of transport. I do not know the figure earned by the London Transport Executive from our foreign friends, but I do know that one of the finest pieces of publicity for Britain was the North American coast-to-coast tour in 1952 of three London double-decker buses. This was a combined exercise by my Association and London Transport which is still remembered wherever the buses travelled. They were in a very real sense vehicles of Anglo-American goodwill, and the venture was described by the *New York Herald Tribune* as the best promotion idea for a generation.

Now I have mentioned the financial significance of tourism to hotels, shipping, airlines, railways, road transport, entertainment and the less obvious, though very real, benefits to our manufactures of a thriving tourist business. There is a tremendous economic potential in this business and even the prosperity of our great banks is affected by the success or failure of the 'Come to Britain' campaign carried out by the British Travel and Holidays Association.

I hope I have said enough to convince you that the whole nation is enriched by a prosperous tourist industry, and have indicated strongly enough, since we are dependent on public as well as Government support, the necessity for having the value of this industry more widely appreciated. All this very desirable and steady increase of traffic does not just happen. Other nations are fully aware of what the tourist can mean in the international balance of payments position. There is just as keen rivalry and competition for this business as for any other. Steady and sustained publicity, and advertising based on sound research, telling the world what we have to offer in the way of tourist attractions, is necessary. That is exactly what my Association does by means of the press, radio, television, posters, films, literature and our overseas offices.

But, as in the case of commodities, the quality of the services available in the country must measure up to what the tourist has been led to expect. A great deal has been accomplished by both Government and industry. The Government has now removed most of the outstanding restrictions. The end of food rationing

gave fresh incentive to our catering and hotel industries. Building licence restrictions on the hotel industry have been removed; easing of certain frontier formalities, such as the abolition of visas for visitors from many European countries, the simplification of currency controls and the increase in the British and many foreign travel allowances have contributed largely to the improved situation. In all sections of the tourist trade, modernization and introduction of new equipment and new transport services have helped to meet the increasing demand from overseas—a demand which I believe is capable of expansion at the rate of ten per cent per year over, say, the next ten years, provided the national promotion campaign continues unabated under peaceful international conditions. You cannot put a quart into a pint bottle, and our travel trade services, especially good hotel accommodation, must be increased in London, Edinburgh and key tourist centres if we are to take care of this increase. The kind of accommodation required is bedrooms with private bathrooms, or even showers. Much can be done by improvement and modernization of, and addition to, existing hotels, and I am glad to say that there are a number of interesting projects of this kind going forward at the present time.

The hotel industry, however, is handicapped by its treatment as a domestic and not as an important 'export' industry. Hotels are the backbone of tourism and in most continental countries, which are in direct competition with us, they are regarded as being of vital importance in the national economy. In this country, by contrast, hotels are taxed more heavily than almost any manufacturing industry. For instance, the hotelier has to pay purchase tax on his equipment and, unlike owners of industrial buildings, he is granted no rate concessions. Again would it not be within the realm of possibility to encourage our hotel industry by letting these establishments have the benefit of commercial user rates for gas and electricity? Some amendments to our antiquated and inconsistent licensing laws would also be helpful and appreciated by our visitors.

While I am touching on the question of measures likely to help the 'Come to Britain' campaign, I would just like to mention how pleased my Association was to learn of the comprehensive modernization plans of the British Transport Commission. Let us hope that these bold plans will be allowed to go forward with the least possible delay. Those of us who, like myself, worked closely with our railways throughout the war years, know what a magnificent job they did and the tremendous wear and tear on rolling stock and permanent way this all-out effort involved.

More and better roads, particularly in our tourist areas, are badly needed and, although I realize that all these improvements are bound to cost a lot of money, they are investments for the future that will enable us to cope with the inevitable increase in the travel movement.

If you think I am over-optimistic about the great potential of the world travel market, I would refer you to the rapid developments in air transport alone. Last year, nearly 70 million passengers were carried by the world's airlines against a total of 59 million in 1954. In 1945 the figure was a mere 9,500,000. It is estimated that in 1956 the passenger figure may reach 85 million. More and

faster ships, planes, trains and road transport will give more and more people the chance and the urge to travel and higher standards of living with higher personal income and greater leisure will enable them to gratify their urge. The introduction of new means of transport has always led to tremendous evolution in travel. Railways made our resorts, the steamship on the Atlantic built America. In the years prior to 1914, over one million immigrants per year went from Europe to America—a volume of trans-atlantic passenger movement exceeding the best we have ever achieved since. Now the air age is beginning to build new travel movements of unprecedented volume. The greatest change in the world to-day is the mass movement of people. It is true that at present this mass movement is mainly confined to Europe and America, but other continents await development. There are to-day about 50 million tourist journeys in the world each year—and this interchange of people has been rising at the rate of ten per cent or more every year. So far there is no sign of slacking off. The potential is breath-takingly large.

The British Travel and Holidays Association can play its part by attracting greater numbers of visitors, but, as I said at the very beginning of my remarks, it is up to the suppliers of services and goods, and to the British people themselves to do the rest. Up to the present time, the tourist trade has been considered as a sort of side-line. It must be recognized as a vast and important industry and given a correspondingly high degree of priority in the nation's economic development plans. Let us remember, too, that improved and increased tourist services benefit the home traveller and visitor alike, and improve conditions all round.

There can be few who do not appreciate the close relationship between improved international travel and the establishment of more peaceful conditions throughout the world. This was emphasized dramatically in the report of President Eisenhower following the recent Geneva Conference. The President said:

> The subject that took most of our attention in this regard was the possibility of increased visits by the citizens of one country into the territory of another, doing this in such ways as to give each the fullest possible opportunity to learn about the people of the other nation.
>
> Now, in this particular subject, there was the greatest possible degree of agreement. And as a matter of fact, it was agreement often repeated and enthusiastically supported by the words of the members of each side.

Unfortunately, the seeds of agreement planted at Geneva largely failed to ripen at the Foreign Ministers' conference which followed. Nonetheless, it remains true that, in the words of the European Travel Commission slogan, 'Understanding through travel is the passport to peace'.

In these days of scepticism, suspicion and uncertainty, I feel most deeply that this social aspect of tourism is even more important than the economic advantages. Speedy transport and communications have eliminated distance as our forefathers knew it and has literally made all the world neighbours. Whether they shall be good neighbours or bad depends on how well they know and

understand each other and how much they appreciate the other fellow's point of view.

It is surprising how misunderstandings, hatreds and dislikes can be dispersed by personal visits, always provided, of course, that the visitor is well received by the visited and that differences of outlook are appreciated. That is where each one of us has an important part to play, the importance varying in degree only with the measure of opportunity.

The immigration and customs officers are very often the first contact the stranger has with a new land and his reception at the point of entry may very well colour his entire outlook on a nation. Hotel receptionists and staff, dining car attendants and railway staffs, bus conductors, policemen, ships' staffs, and airline crews and last, but not least, John Citizen himself—all have their part to play in showing courtesy and helpfulness to the visitor from overseas, or to the stranger from another part of the country.

I have told you something of the rapid development of the British tourist industry during the past decade. To-day, I repeat, it is one of our greatest and most lucrative industries, and I can see no limit to its expansion if we are able to provide the necessary amenities. Britain's scenic splendours, her rich historical heritage, her architectural glories are priceless assets to the tourist industry, but they are not enough. We must have a wider and deeper understanding among all sections of the community of the importance of tourism. To develop this great new industry to the full, there has to be a climate of opinion favourable to the whole idea of travel and its value to mankind.

The Royal Society of Arts has a long and distinguished record as a pioneer over a wide field of human activity. When Prince Albert became its President a little more than a hundred years ago, the Society gave a lead in the sphere of industrial design. The Prince Consort's encouragement of the Society's exhibitions led to the Great Exhibition of 1851.

To-day our gracious Queen's consort, His Royal Highness The Duke of Edinburgh, is President of the Society and he has also honoured my Association by becoming its Patron. His Royal Highness has shown by his lively interest in many fields of human endeavour that he is a man of vigour and vision, receptive to new ideas and new trends. I am confident that the members of this distinguished Society, who occupy positions of influence and eminence in our public life, will strengthen this royal link between the Society and my Association by encouraging in every way this new industry.

Britain's tourist industry is still a fledgling compared with most of our great industries, but it is growing up rapidly. The rate of its expansion in the past decade has been phenomenal. There is no reason why this expansion should not continue. A target worth aiming at is two million visitors spending £300 million in a year. But to achieve this the industry needs the wholehearted support of the Government and of the country as a whole. In return, tourism will make a great contribution to national prosperity and, at the same time, it will be strengthening the desire throughout the world for happy and peaceful relations between the peoples of all nations.

TABLE III. BRITAIN'S TOURIST TRAFFIC 1953 TO 1955

	1953	1954	1955
Europe	411,690	457,970	528,000
United States:			
United States nationals	186,400	202,840	238,000
Resident British	12,380	13,480	13,500
Canada	46,280	51,880	53,000
Other Commonwealth countries ..	127,380	136,480	159,000
Central and South America ..	13,100	14,600	14,500
Other countries	21,370	24,210	29,000
Grand Total	818,600	901,460	1,035,000
Visitors from United States in transit through United Kingdom	34,300	33,280	35,500

1956 estimate: 1,125,000 visitors. £170 m. expenditure.

DISCUSSION

MR. H. BAILLIE-RITCHIE: Could the lecturer tell us if there is any means of ascertaining beforehand the number of tourists from different countries so that appropriate arrangements may be made, suitable to the various nationalities concerned?

THE LECTURER: Every year we have the basis of the figures we have obtained during the previous year and from those figures we do forecast the number of visitors we hope to get from each country. I am glad to say our Research Officer is here in the room, and I would like to pay this tribute to him; he has never been more than a few out one way or the other. So we know, and we are very conscious of, the importance of aiming our literature at each particular type of visitor and we always do that in the language of the country itself.

THE CHAIRMAN: You have heard from Mr. Bridges of the potential economics of tourism in Britain and what we can build it up to if we will; and the film has shown the way in which Mr. Bridges and his organization promote that idea abroad. As one who has had the benefit of intimate association with the work of Mr. Bridges and his colleagues in many parts of the world, in Australia, in the United States and Canada, and in many countries in Europe, I can testify that wherever you go abroad, whether the country or city is large or small, the quality of the appeal which Mr. Bridges puts out for Britain is always the same, it is always of the highest quality. As the film showed, there is nothing cheap or superficial; there is emphasis always on the ever-lasting value of what Britain and British civilization have to offer to a slightly mad world, and it is highly important in my opinion that the work that the Association is doing all over the world should be known to and appreciated by a growing number of people in this country and every walk of life. All benefit by it.

The appeal is never made to the sensational, but always made to the mind and the eye of the prospective travellers, telling them that they will find in these islands what they will not find elsewhere and which will give them something too that will enrich their thoughts for as long as they can remember their visit to Britain. It is therefore of great importance, in my opinion, not only from the point of view of the money which the tourist industry brings to this country—that is important enough—it is not only the dollars which, as Mr. Bridges says, pay for all our tobacco and wheat;

it is the aim that, in a world where the ideologies are conflicting and difficult, the British way of life and the values that we put on things are better understood. There is no finer way of doing that than by encouraging people to come and see us as we are, and the country as it is. For that reason I feel greatly indebted, as I know that the Association does, to the Royal Society of Arts for having honoured us by giving us the opportunity to have this meeting and this film to-day.

The quality of any appeal comes always from the top. A good many men have contributed to the 'Come to Britain' movement, as it came to be known (and it is not a bad title still). Starting with Sir Francis Towle, there then came a number of others, among them the late Lord Hacking, who played a pioneer part in the building up of the Association; Sir Alexander Maxwell, who unfortunately could not be here to-day; and my own revered chief Sir Herbert Walker, who put the whole of the continental agencies of the Southern Railway at the service of the movement in the early days; but in the end it comes down to the man at the head of the day-to-day organization—Mr. Bridges. It is the quality of his mind, the good Scotch sense of how to spend his money, our money, and his personal belief and enthusiasm and the love for the work which he is doing, that is rapidly putting the British way of life into the minds of people who have not always realized what we stand for. For that we should be sincerely grateful to him.

So I can telescope two of my duties into one by asking you to express in the usual way your very hearty thanks to Mr. Bridges for coming here and reading his paper, and giving us the opportunity of seeing his kind of film. It is not only the films, it is the same with the press advertisements, his beautiful yet practical and effective offices and their splendid staffs which now exist all over the world, and which make British people proud to see them when they go abroad. They are allied in a very sensible and practical way with all the British shipping, with the railways and the air companies, so that they do not overlap and try to do the same thing and so waste money. That is the achievement which Mr. Bridges has brought about, and I ask you now to give him your very hearty vote of thanks.

A vote of thanks to the Lecturer was carried with acclamation.

SIR STEPHEN TALLENTS, K.C.M.G., C.B., C.B.E. (A Member of Council of the Society): I fulfil a duty undertaken on behalf of the Council of the Society by moving a vote of thanks to you, Sir, for taking the chair to-day. It was suggested early in the proceedings that our tourist traffic had never before been the subject of a paper read in this Hall. If that be so, you have presided here on a unique occasion which, I hope, will not long so remain.

Here, after all, is a form of export trade in which every individual among us can take an active part. Few of us can, maybe, have a chance of selling a British car abroad; but we can all do what I was trying to do with a honeymooning American couple a few days ago coming down from Edinburgh, namely selling them the prospect of a return visit which should include some of the less heralded beauties of England, including the beauties of East Anglia. Only yesterday in Norwich I was being coached against their return by a personally conducted tour of Norwich Cathedral.

There is no one in this country who does not know or cannot discover in Britain some beauty, some historic inheritance, some technical achievement, well calculated to lure visitors to its inspection; who cannot, by letters to friends or associates overseas, or casual conversation with strangers at home or abroad, quicken their interest in this country and so contribute to the promotion of that vital export trade of ours, the tourist traffic. Therefore, Sir John, I find this meeting, over which you have done us the honour of presiding, a particularly happy and fruitful occasion. No one could be better qualified by experience supported by sympathy and enthusiasm to have presided over it; and not only the Society but this audience and those who read the reports of our proceedings are much in your debt.

A vote of thanks to the Chairman was carried with acclamation, and the meeting then ended.

ELECTRONIC PHOTOGRAPHY

The Peter Le Neve Foster Lecture by

C. G. MAYER, O.B.E., M.I.E.E.,

of the Radio Corporation of America, delivered to the Society on Wednesday, 16th May, 1956, with Sir Harold Bishop, C.B.E., F.C.G.I., M.I.E.E., M.I.Mech.E., Director of Technical Services, B.B.C., in the Chair

THE CHAIRMAN: The Peter Le Neve Foster Lecture was established in 1938 as an annual memorial to Peter Le Neve Foster, who was Secretary of the Society of Arts from 1853 to his death in 1879. The family connection with the Society goes much further back than that, to 1761, when Peter Le Neve Foster's grandfather joined the Society. He himself became a member in 1837, and filled the office of Treasurer from 1849 to 1851.

He was greatly interested in photography, and helped to found the Royal Photographic Society which held its first meeting in this building, and it is therefore particularly appropriate that this afternoon's lecture should be associated with his name.

The family connection with the Society has been maintained continuously since those early days, and the present list of Fellows includes a grandson and a great grandson of the Peter Le Neve Foster whom we are commemorating to-day. The great grandson, also Peter Le Neve Foster, is now a Treasurer of the Society, and represents the seventh generation of his family in the Society.

The following lecture, which was illustrated by demonstrations and lantern slides, was then delivered:

THE LECTURE

The art and science of photography is a familiar subject in the history of this lecture hall, in which a number of illustrious speakers have reported on progress made through the years. In 1952 the Peter Le Neve Foster lecture was entitled 'A Century of Photography'[1] and traced the development of this fascinating subject. It is my privilege to-day to tell you about some steps being taken in a new direction which show promise of revolutionizing our concepts of photography.

In the minds of most people the word 'photography', when thought about beyond the exposure stage, has come to be associated with the idea of a somewhat wet and messy process involving a variety of chemicals. This is reflected to some extent by the definition in a number of well-known dictionaries in which 'photography' is defined as 'picture taken by means of chemical action on sensitive film, glass, paper, etc.'. But with knowledge gained from advances in solid state physics it is now realized that this definition is far too narrow and limited. 'Photography' stems from the Greek words *photos* meaning light and *graphos* denoting writing. Webster correctly defines the word as 'the art or process of producing images on sensitive surfaces by the action of light'.

In this broad sense the visual process of the human eye, often overlooked because it is so close at hand, is by far the oldest, the most versatile and patently the most common photographic process known to man. Likewise, the eyes of the creatures around us, some with very specialized characteristics, continue to be a source of wonderment since our detailed knowledge of the mechanism of seeing is still very incomplete.

The ubiquitous photographic film, with its light-sensitive silver-halide emulsion, is used by millions of people all over the world and needs no introduction. Less familiar, but rapidly becoming commonplace, is television, a powerful tool for the extension of sight. More recently, considerable progress has been made with electrostatic systems of photography, one of which, known as 'Electrofax'[2], I will be demonstrating to you shortly.

A quick review of these various systems of photography gives one much more the impression of unrelated diversity than of possessing any unifying guiding principles. Yet in a very real sense they all share a common set of elements and are bound by the same limitations. The common factor lies in electronics, which is fundamental to all known forms of photography.

Consider the series of steps extending from the taking of a picture through amplification and storage, to its final presentation. The first step is the exposure of the sensitive surface to the stream of light quanta radiating from a scene. Light quanta are units of energy known as 'photons' and the number for any given set of conditions is, of course, finite. Now the object is to obtain as much information as possible from the available number of photons resulting from the exposure. This would be achieved if each photon were recorded in such a way that it could later be recognized as a separate and countable event[3]. The absorption of a photon is truly an electronic process. Each absorbed photon excites an electron from its initial state to an energy level about two electron volts higher. This occurs for the silver halide emulsions just as for any other photographic process. In the case of these emulsions the record of the excited electron is preserved by the resulting deposition of one neutral silver atom to mark the event. Until recently about 100 photons were required before one of these marking events took place, but more sensitive emulsions are gradually being developed and will bring the number closer to the ultimate limit of unity.

In summary then, the first step in photography is strictly an electronic process in which the trace of each photon is recorded, as for example by deposition of a silver atom in a film emulsion. This is the latent image and is not immediately visible.

The next step is to amplify the record so that it can be seen by the eye. Since the resolving power of photographic systems is of the order of a micron, and a speck of matter of this size contains roughly 10 billion atoms (10^{10}), the order of amplification required is about 10 billion times. With the silver halides this amplification takes place by chemical action, and development occurs provided one or more silver atoms are present to act as a nucleus for reduction of the halide to silver.

It is this second step of amplification that contains the essential variety of the

photographic processes. In television systems it is achieved by a series of elements involving electron multipliers, high gain amplifiers, and high voltage electron beams. In the human eye the reaction has not been fully identified, but is believed to result from a catalytic process. In the case of electrostatic systems of photography a small number of electron charges determine whether a micron size particle of matter is deposited to make the print or not. Other amplification processes are certainly conceivable.

Thus the distinguishing feature of the familiar photographic film system now has a number of promising competitors.

The third step to be distinguished is storage. It is often accomplished at the same time as amplification, as for example with photographic emulsions and in the Electrofax system. On the other hand, storage may be an important and separate item, as in the magnetic recording of television images. Here the amplification is effected by high gain amplifiers, while the conversion of the information into a form suitable for storage and later presentation is carried out by recording the high level output of the amplifiers as a modulation of the magnetization of a magnetic tape. In this connection, it is worth remembering that the human system has its own marvellous storage or memory system that is separate from its method of amplification.

The last step required to view a photographic picture is that of 'presentation'. It also can be combined with amplification and with storage, making it possible to develop the latent electronic image in the one step. This happens with the silver halides and with Electrofax. The most common and convenient mode of presentation is by variation in the reflectivity of a surface. Another method is by variation of transmission, as in photographic transparencies, or by modulation of a light valve. In television, presentation generally takes the form of pictures on the self-luminous screen of a cathode ray tube or kinescope, or by projection. Various other modes of presentation are also possible.

The four steps just outlined—exposure, amplification, storage, and presentation are inherent in every system of photography. The silver halide film is no longer the only method of importance, several others exist and many more are conceivable. In passing, it may be noted that the performance of any photographic system is circumscribed by the finite number of randomly spaced photons at its disposal, and by the equivalent signal-to-noise ratio at every stage of the process. With this introduction, I propose in the space remaining to deal with the electronic aspects of two of the photographic techniques already mentioned.

ELECTROFAX

This is an electrostatic process for graphic reproduction and photography developed at the RCA Laboratories, Princeton, New Jersey. It shows promise of becoming a valuable alternative to other photosensitive materials now used in photography, in office copying and duplication, in photo-engraving and other photo-resist applications, and in many other fields.

All electrostatic systems of photography are dry and rapid. In principle, they depend on the use of a photoconductive insulating material whose surface

can be electrically charged. The best-known system, called 'Xerography', has been described[4] as employing

> a re-usable plate consisting of a thin layer of a photoconductive material on an electronically conducting base. The plate is sensitized by electrostatic charging immediately before use. After exposure, the image is developed by dusting the plate with a micronized powder. Prints are made by transferring and fixing the powder image to paper or other materials.

In the Electrofax process the photosensitive element is a mixture of a powdered photo-conductor in a resin binder, which can be easily coated on practically any base, metallic or otherwise. One of the attractive features of this photo process comes from the discovery that zinc oxide, which is commonly used for medical preparations, paints and other purposes, is also an excellent photo-conductive material for Electrofax. It is relatively inexpensive, white in colour, and when the mixture is applied to an ordinary paper base, it results in a coated paper possessing the photographic sensitivity and other general characteristics of normal silver halide printing papers. In addition, Electrofax paper has distinct advantages of low cost, long shelf life, and insensitivity to light until electronically charged. It may therefore be handled without fear of inadvertent exposure until the coating is given an electrostatic charge. This charge is applied in the dark or under suitable safelight conditions by transfer of ions resulting from a charged wire being swept across the coated surface. In this charged condition the paper is sensitized and ready to be exposed, and the usual precautions must be taken to shield it from stray light. Exposure by any of the conventional means has the effect of reducing the charge in the areas exposed in proportion to the amount of incident light (or photons), thus leaving a latent electrostatic image on the surface of the coating which corresponds to the dark areas of the original. This electrical image can be developed in a single step involving amplification, storage and visible presentation. It is achieved by applying a positively charged pigmented resin powder, or toner as it is called, which adheres by electrostatic attraction to the negatively charged areas on the coated surface.

FIGURE 1. *High-voltage supply, corona-charging unit, ground plate, and light source for making Electrofax hand-process plates*

Several methods are possible for charging and applying the toner. One ingenious and convenient way of accomplishing this is by means of a

'magnetic' brush which reveals the image immediately as the brush is swept across the paper, just as though the picture were being painted on by magic. In this method the image on the paper is built up by deposits of the toner powder. The quantity of the charge at any point determines the amount of powder deposited at that point, and thus the corresponding density of the resulting image. Fixing of the image is effected by baking for a few seconds at a temperature which causes the toner to melt and fuse to the paper surface. This may be done in the light, since the powder image stays in place for some time. If for any reason the image should be unsatisfactory it may simply be erased, before baking, by first exposing to a strong uniform light to cause the charge to flow off under the developed areas, then merely rubbing over again with the magentic brush to pick up the powder released from the photosensitive surface. The paper can then be used again. After baking, the image is as rugged and as permanent as an impression in printers ink. The heat-fixing operation does not destroy the photo-conductive properties of the coating, thus allowing additional Electrofax printing at any time by a simple repetition of the procedure. Using coloured toners, multicolour prints are possible. Electrofax paper is stable and will keep indefinitely without deterioration.

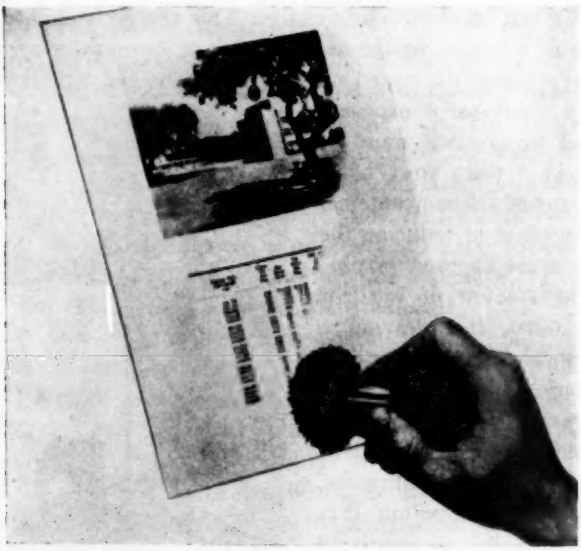

FIGURE 2. *Using the RCA magnetic brush to develop the latest electrostatic image*

The methods described enable a finished handmade Electrofax picture to be produced in a few seconds with the very simple apparatus shown in Figure 1. The Electrofax paper is placed on a metal plate and exposed to a corona discharge from one or more fine wires held at a D.C. potential of about 6 Kv negative with respect to the metal plate. Ionization of the air surrounding the wires takes place, as in the more familiar ozonizator, and with the same characteristic smell.

Under the influence of the field between the corona ions and the ground plate on which the paper rests, the negative ions in the air are attracted to the surface coating of the paper, and establish a uniform charge density as the corona unit is swept across the paper. Measurement of the surface potential indicates an initial voltage of about 300–600 volts. This value decays slowly in the dark over a period of minutes or hours depending on the nature of the coating.

The magnetic brush shown in Figure 2 consists of a permanent magnet carrying at one end a mass of iron powder loaded with the fusible toner powder. The bristles of the mixture follow the magnetic lines of force, forming a brush-like structure. Contact and rubbing between the particles causes the toner to become positively charged while the iron takes on a negative charge. This is due to a surface phenomena known as 'tribo-electric effect', which may be defined as electrification by contact of materials having different electron affinities. The sign of the charge on the respective materials used depends upon whether electrons are gained or lost by the materials in contact. Thus when the loaded brush is swept over the coated paper, the toner particles are attracted to the charged areas of the electrostatic image and give a reproduction of the original image. The iron carrier powder remains on the parent magnet. Photographic reversal is also possible by several techniques.

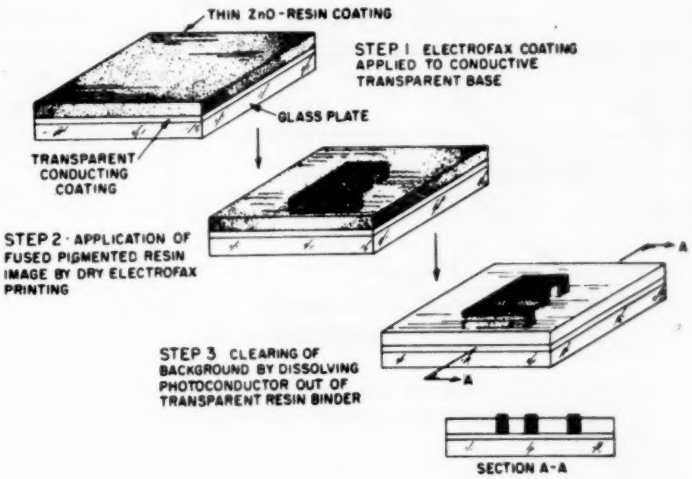
THIN ZnO-RESIN COATING
STEP 1 ELECTROFAX COATING APPLIED TO CONDUCTIVE TRANSPARENT BASE
GLASS PLATE
TRANSPARENT CONDUCTING COATING
STEP 2 · APPLICATION OF FUSED PIGMENTED RESIN IMAGE BY DRY ELECTROFAX PRINTING
A
A
STEP 3 CLEARING OF BACKGROUND BY DISSOLVING PHOTOCONDUCTOR OUT OF TRANSPARENT RESIN BINDER
SECTION A-A

FIGURE 3. *Electrophotographic printing by the Electrofax process*

Figure 3 shows in schematic form the procedure in printing by the Electrofax process'.[5]

PHOTOGRAPHIC CHARACTERISTICS

The sensitivity and contrast of Electrofax coatings processed in the way described are about equivalent to a relatively high contrast silver halide contact printing paper possessing an ASA paper speed of 16. Resolution already

obtained with a 200 mesh developing powder is of the order of 300 to 500 lines per inch, and there is no apparent reason why 1000 lines cannot be achieved. This high resolution with a relatively coarse developing powder is attributable to automatic selection of the finer powder particles by the highly resolved charged image. It is also found that the residual charge after a given optical exposure correlates closely with the measured reflection density of the developed image.

DYE SENSITIZATION

Many dyes which cause fogging or desensitization in silver halide emulsions due to the chemical nature of the reaction can be used to increase the photographic speed and spectral response range of Electrofax coatings. Zinc oxide has an absorption characteristic which makes it sensitive primarily in the ultraviolet and far blue regions of the spectrum. This range may be extended into the visible by the simple addition of common dyes, which have the effect of raising sensitivity due to increased energy absorption over a wider spectral band.

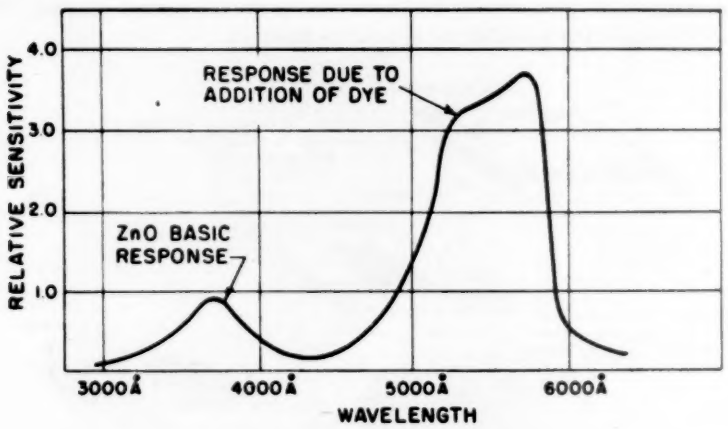

FIGURE 4. *Spectral response of Electrofax coatings sensitized with Rose Bengal (to tungsten light)*

Figure 4 demonstrates this for Rose Bengal, a typical Electrofax orthochromatic sensitizer, which gives an increase in effective speed of about thirty times for tungsten light. Selection of suitable dyes enables special-purpose coated papers to be designed for nearly any desired spectral response. Approximate exposures for Electrofax printing with various light sources are indicated in Figure 5.

Projection printing is easily possible. A prototype microfilm printer built at the RCA Laboratories produces 8½ inch x 11 inch prints from 35 mm microfilm using a one second exposure through an f.8 lens with a 300-watt projection lamp. Outdoor exposures in bright sunlight in an experimentally adapted

camera have produced prints on Rose Bengal sensitized paper with exposures of 1/5 to 1/2 second at f.4·5. This corresponds roughly to an ASA film exposure index of about 0·5.

Light source	*Exposure condition*	*Typical exposure times for a satisfactory print*	
		Unsensitized ZnO paper	*Rose Bengal sensitized paper*
Tungsten 100 w. bulb 2 feet from exposure plane	Contact through positive transparency	$^1/_2$ second	$^1/_{50}$-$^1/_{25}$ second
Black light Two 4 w. fluorescent tubes 2 feet from exposure plane	Contact as above	$^1/_{10}$ second	$^1/_{10}$ second
Electronic flash unit 10 feet from exposed plane	Contact as above	Single flash 10^{-6} to 10^{-5} second	Single flash 10^{-6} to 10^{-5} second
Bright daylight	Adapted camera-lens at f4.5	$^1/_2$-^{5} second	$^1/_{10}$-$^1/_2$ second

FIGURE 5. *Approximate exposure requirement for Electrofax printing under various conditions*

ADAPTABILITY TO SPECIAL APPLICATIONS

The inexpensive and thus expendable nature of the Electrofax coating, coupled with its easy adaptability to many conventional coating techniques, such as whirling, dip, spray, brush or roller coating, open many possibilities for applications not easily possible or commercially feasible with previous photographic systems. Moreover, the system combines the high speed of silver-halide materials with the low cost of diazo and other common materials used in normal copying and photo-resist applications.

Since a variety of resins, waxes and the like may serve as photoconductor binders or as image materials, many chemical processing techniques become possible in adapting the system to a wide range of special applications. A number of these are outlined below.

LITHOGRAPHIC DUPLICATING MASTERS

Any Electrofax print may be converted to a lithographic or offset duplicating master. This process depends on the conversion of the hydrophobic (water repellent) background areas of the print to a sufficiently hydrophilic (water-receptive) character to enable them to function as non-printing areas of the lithographic plate. Meanwhile the grease-receptive character of the image areas is maintained so that it can carry and transfer grease-based inks.

Ordinary Electrofax prints on a low wet-strength light-weight low-cost paper base material used as a master have produced over 1,000 excellent ink-printed copies on a standard offset duplicator. Only a simple swabbing operation is necessary to effect the background conversion, as shown in Figure 6. Coatings on thin metal sheets or other materials function equally well in this system.

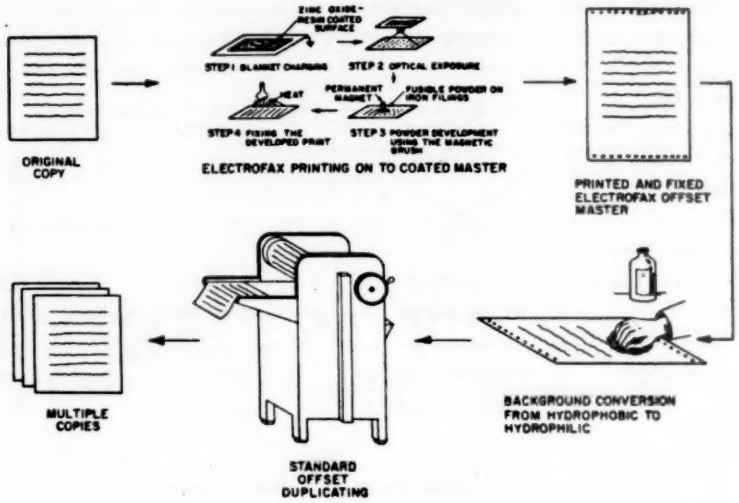
ZINC OXIDE-RESIN COATED SURFACE
STEP 1 BLANKET CHARGING
STEP 2 OPTICAL EXPOSURE
PERMANENT MAGNET
FUSIBLE POWDER ON IRON FILINGS
HEAT
STEP 4 FIXING THE DEVELOPED PRINT
STEP 3 POWDER DEVELOPMENT USING THE MAGNETIC BRUSH
ORIGINAL COPY
ELECTROFAX PRINTING ON TO COATED MASTER
PRINTED AND FIXED ELECTROFAX OFFSET MASTER
BACKGROUND CONVERSION FROM HYDROPHOBIC TO HYDROPHILIC
STANDARD OFFSET DUPLICATING
MULTIPLE COPIES

FIGURE 6. *Electrofax direct printing offset duplicating masters*

The Electrofax system reproduces tonal gradation without auxiliary optical 'half-tone' screening. This is the term used to describe the process of breaking up an image into dots of various sizes to enable reproduction of intermediate shades of grey or colour in a printing process. The picture developed from the latent electrostatic image is made up of discrete powder deposits which, on fusing, form in effect a random screened half-tone reproduction of the original, and enable excellent quality offset reproductions to be made.

HIGH-SPEED PHOTO-RESIST

In photoengraving operations, such as the making of relief printing plates (letterpress plates), engraved name plates, and aperture masks (such as the

shadow mask in colour kinescopes), an etch-resistant pattern is laid down to mask desired areas of the surface. A specially sensitized glue or resin coating is normally used for this purpose, which is rendered insoluble to the etching fluid by exposure to intense ultraviolet radiation. Several minutes of exposure to arc light is required, with the coated surface exposed by contact printing in a vacuum printing frame with a specially prepared high contrast film. After exposure the coating is washed off the non-hardened areas. Similar photographically hardened coatings are used for other masking operations, such as in photolithography or the making of silk screens. The term 'photo-resist' is given to these processes.

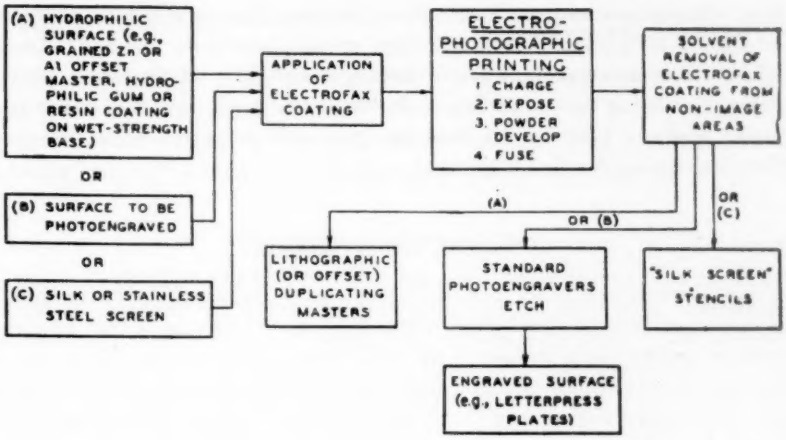

FIGURE 7. *Steps involved in the use of Electrofax high-speed photo-resist method in several typical applications. Similar techniques may be used for many other masking operations*

If an Electrofax coating is applied in a thin layer to a suitable base, and printed in the normal way with an image comprised of a resin having different solvent characteristics from that used as the binder in the photo-conductive layer, the combination may form the basis for a high-speed photo-resist technique, as outlined in Figure 7. After fixing the fused resist image produced by Electrofax printing, the base material is laid bare in non-image areas by use of a differential solvent, and may then be subjected to etching or other subsequent treatment as desired. This method has been used successfully for the rapid production of relief and lithographic printing plates, silk screen stencils, printed circuit boards and many other items.

The Electrofax resist-system possesses light sensitivities of the order of 10,000 to 100,000 times those of dichromate or diazo-sensitized coatings normally used in photo-resist formulations. Thus pre-coated Electrofax plates

can be used directly in a copying or process camera, with exposure times comparable with those for process films.

LETTERPRESS (RELIEF) PRINTING PLATES

The photo-resist method just outlined enables good quality relief printing plates to be produced. These include both line-cuts (copy or illustrations comprised of line work, printed text, or solid areas only) and half tones on zinc, copper and magnesium.

DRY OFFSET PLATES

Dry offset plates with normal shallow relief for use on standard equipment may readily be prepared using the high speed photo-resist method. Another method which shows promise for furnishing the shallow relief images required, consists of utilizing the top surface of the fused electrophotographic image as the printing surface. This can be built up .001 inch or more above the coated Electrofax surface for the purpose.

PRINTED CIRCUIT BOARDS

Printed circuit boards are now much in demand and may be prepared quickly and easily by the high speed photo-resist method. In this case, a thin Electrofax coating is applied to the surface of the usual copper-clad laminate (about one mil of copper cemented to a phenolic base). The desired circuit pattern is exposed on to the charged surface and the image developed with an acid resistant toner and fused in place in the usual way. After removal of the Electrofax coating in the non-image areas by differential solvent action, the exposed copper is dissolved away completely in these areas leaving conducting paths only where the copper is protected by the fused Electrofax pattern. This can now be washed off with a second solvent, leaving the copper circuit pattern ready for use.

In this way either experimental or production printed circuit boards may be produced in a matter of minutes with an enlargement or reduction as desired. No intermediate photographic transparencies are needed, as the resist image may be laid down by contact printing from any any circuit drawn on tracing paper. If enlargement or reduction is desired, or if the drawing is on an opaque base, exposure is by projection.

PHOTOGRAPHIC TRANSPARENCIES

If an Electrofax coating is applied to a transparent base, lantern slides, photographic films, or other transparencies may be produced by several techniques. One way of producing lantern slides is illustrated in Figure 8. In this method a sheet of glass coated with a transparent conductive coating is given an Electrofax coating, the desired image then printed in the usual way, and the

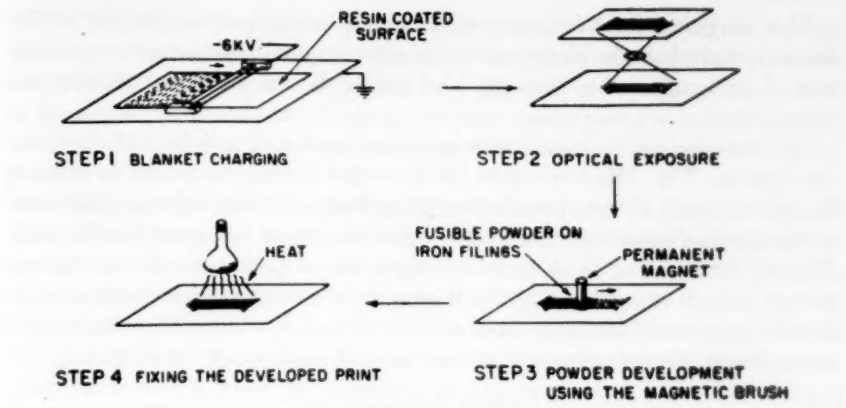

FIGURE 8. *Production of electrophotographic transparencies*

zinc-oxide dissolved out by use of a suitable solvent. This leaves the fused Electrofax image on a transparent background, ready for projection.

AUTOMATIC ENLARGER-PRINTER

A recent application of the Electrofax process to reach commercial status has been the development of a fast automatic dry direct enlarger-printer. It is capable of reproducing standard sizes of engineering drawings from microfilm originals at a rate of fifteen 17 × 22 inch prints per minute. The machine requires neither darkroom nor chemicals, and provides a new order of efficiency, speed and economy in the mass production of engineering drawings. It can accept 35 mm. positive film either in roll form or on 'Filmsort' type punched cards containing selected picture frames. A schematic diagram of the enlarger-printer is shown in Figure 9.

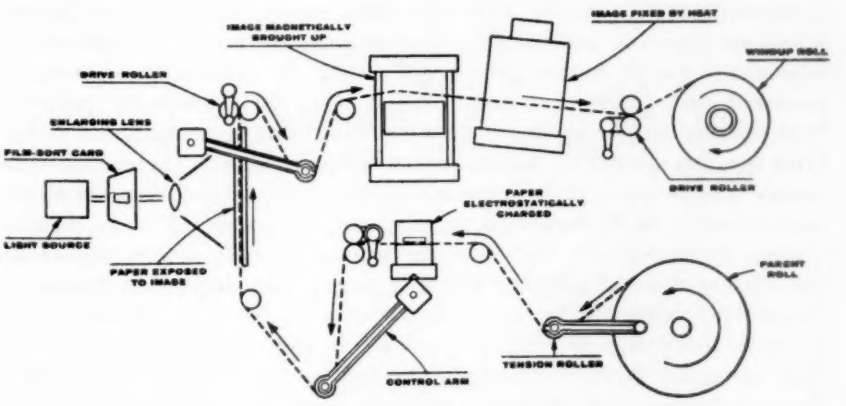

FIGURE 9. *RCA Bizmac microfilm enlarger, using the RCA Electrofax dry printing process*

This integrated reproduction system eliminates the space needed for storing full-size originals at the places where copies are required, and permits centralization of vital engineering drawings in a master file for maximum security and preservation.

The machine can be loaded with up to 500 cards in a rack located above the lens system. The 'Filmsort' cards can be sorted quickly according to category by conventional electric punched-card machines. In the enlarger, cards are automatically dropped in front of the lens at the rate of one every four seconds. The roll film, in lengths of up to 100 feet is also fed automatically at the same picture rate. It is estimated by the Bureau of Aeronautics that the system makes possible a potential saving to naval aviation of over a million dollars annually in procurement, reproduction and storage costs of engineering drawings.

OTHER APPLICATIONS

Every trade and industry will find applications for the Electrofax process to meet its own needs. Old methods will give way to new, and some of the things that were not feasible previously will come to life. Time is too short to mention more than a few, but the use of Electrofax is being actively explored for such diverse purposes as marking of templates for shipbuilding and airplane fabrication; mural decorations and decorative panels; name plates and package labelling. And since Electrofax coatings are also sensitive to X-rays, an important field will be the recording of X-ray examinations for all kinds of medical and industrial applications. Examples of some of these applications are on display here.

So much for Electrofax; we must now turn to consider some of the electronic aspects of another photographic technique developed out of research on television.

VIDEO TAPE RECORDING

The magnetic recording and reproduction of colour and black-and-white television signals on magnetic tape is another striking example of the application of electronics to photography. The conventional way of storing television pictures is to make kinescope recordings by photographing the screen of a cathode ray tube with a special motion picture film camera. The film is then chemically processed, and usually a contact print is made for reproducing purposes. Reproduction requires another installation, which may be a continuous motion flying spot film scanner or a motion-picture film projector with a special television camera. The process is time consuming and the quality limited, since the picture must encounter all the hazards of both the television system and of the chemical process. By comparison, the video tape method provides a swift, economical and efficient means of recording television programmes. It does not involve any chemical processing and the optical transfer step is eliminated. The tape can be preserved indefinitely for reference, or it can be electrically erased and re-used again and again. Pictures recorded on the tape can be viewed or monitored as they are being recorded, and the same machine used for recording can be used for reproduction. The only disadvantage seems to be that one cannot see what is on the tape just by looking at it, as is possible with film.

The magnetic tape system operates by impressing electrical signals corresponding to picture and sound information, through a recording head on to the magnetically treated surface of a plastic tape. Elements of the tape are magnetized in proportion to the signal voltage as the tape moves past the recording head, and the information is stored on the tape in the form of a characteristic magnetic pattern.

In playing back the recorded programme the tape is moved past the magnetic head at the same speed used during recording, thereby inducing a signal voltage in the head corresponding to the magnetic recording. It is similar in principle to the popular magnetic sound tape recorder which is rapidly finding its way into people's homes everywhere. The main differences lie in the magnitude of the quantities involved. Recording of television picture signals involves frequencies beyond 3 Mc/s, or more than 200 times the top frequency of sound recordings. The normal speed for high fidelity sound tapes is $7\frac{1}{2}$ inches per second, giving a top frequency response of about 15,000 cycles. Since the highest frequency is determined by the linear speed of the tape past the magnetic head, the use of normal type soundheads would require a speed of about ninety miles an hour to give the video response needed for television. Of course, this would be quite impracticable for a number of reasons.

In the search for a system capable of recording television programmes in colour, efforts have concentrated on finding ways of reducing the amount of tape required in order to keep cost low, and so that at least 15 minutes of recording time can be accommodated on a single spool not exceeding twenty inches in

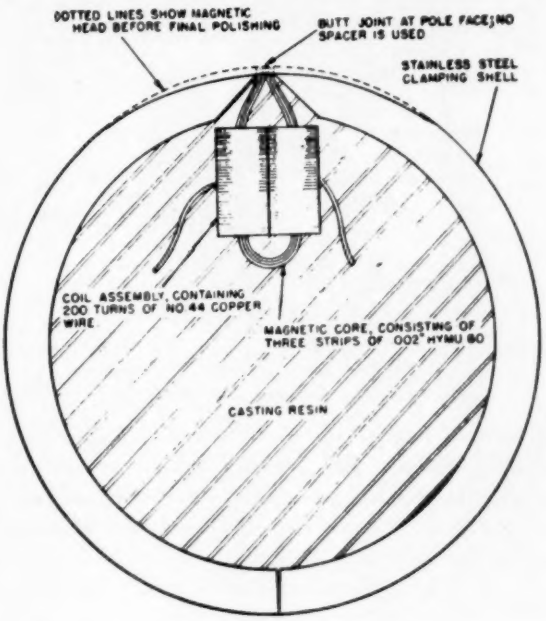
DOTTED LINES SHOW MAGNETIC HEAD BEFORE FINAL POLISHING
BUTT JOINT AT POLE FACES NO SPACER IS USED
STAINLESS STEEL CLAMPING SHELL
COIL ASSEMBLY, CONTAINING 200 TURNS OF NO 44 COPPER WIRE
MAGNETIC CORE, CONSISTING OF THREE STRIPS OF .002" HYMU 80
CASTING RESIN

FIGURE 10. *Cross section of basic element*

diameter. The primary problem was the development of a magnetic head which could resolve five to ten times as much information per linear inch of tape so that the tape speed could be reduced to manageable proportions. In addition to its resolving ability, which is a function of the geometry of the gap, the electrical performance of the head must be adequate over the entire bandwidth of frequencies. This means keeping its impedance within bounds and free from resonances over a range of about 13 octaves. The mechanical design of the head must also be adaptable to multiple element construction, with the attendant problems of alignment and positioning of the gaps. After many experiments, a design was evolved at the RCA Laboratories which made it possible to record and reproduce more than 15,000 cycles per linear inch for soundheads. The cross section of a basic elemental head is shown in Figure 10. With these new video heads the upper frequency limit is about 3.5 Mc/s at a tape speed of twenty feet per second. The effective gap length can be deduced from these figures as being no greater than one wavelength or about seventy millionths of an inch. The design permits the use of a relatively high impedance coil without resonance troubles. Crosstalk between elements is negligible.

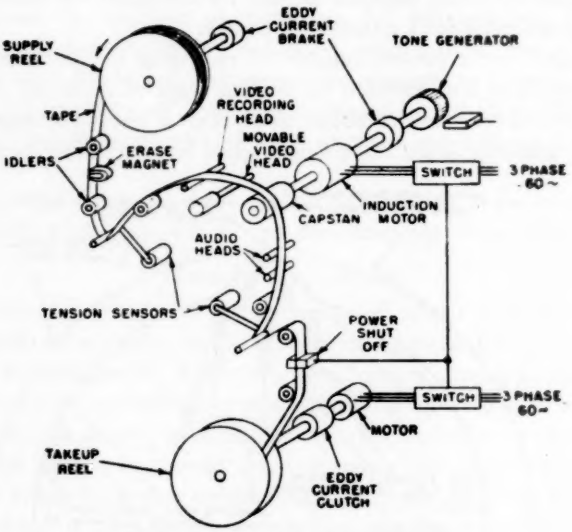

FIGURE 11. *Schematic representation of mechanical arrangement*

While this work of establishing the means of recording and reproducing the required signal on the tape was in progress, studies were also being made of the tape transport mechanism to minimize the effects of irregularities of tape motion. The importance of this can be appreciated when one considers that a change of one part in five million in the tape speed will produce a jog of 1/16th inch in the picture on the face of a 21 inch television tube. Since it is a matter of controlling relative velocity between tape and head, either or both can be moved with respect to each other to compensate for any irregularities.

A practical solution was found by providing two separate servo feedback mechanisms. A schematic representation of the mechanical arrangement is shown in Figure 11. One servo controls the rotational speed of the capstan driving the tape, by comparing the output from a tone-wheel alternator mounted on the same shaft with the horizontal synchronizing signal from the local synchronizing generator. The error signal is applied to an eddy current brake, and results in the speed of the tape at the capstan being held constant within the accuracy of the servo and the machined parts. The other servo operates to reduce irregularities manifested as a jitter of the picture. This is achieved by comparing the phase from the output of the horizontal synchronizing signal from the tape, with the horizontal synchronizing signal from the local synchronizing generator. The error signal is applied to control the motion of a low-inertia movable head which acts to reduce the phase difference to a minimum. In this way the phase of the video output is maintained exceedingly accurate with respect to the local synchronizing signals. Besides these controls, provision also has to be made for proper tension control of the tape from start to stop.

Equipment incorporating these refinements is shown in Figure 12, and full details are given in a series of papers presented at the Institute of Radio Engineers Convention in New York during March, 1956.[6]

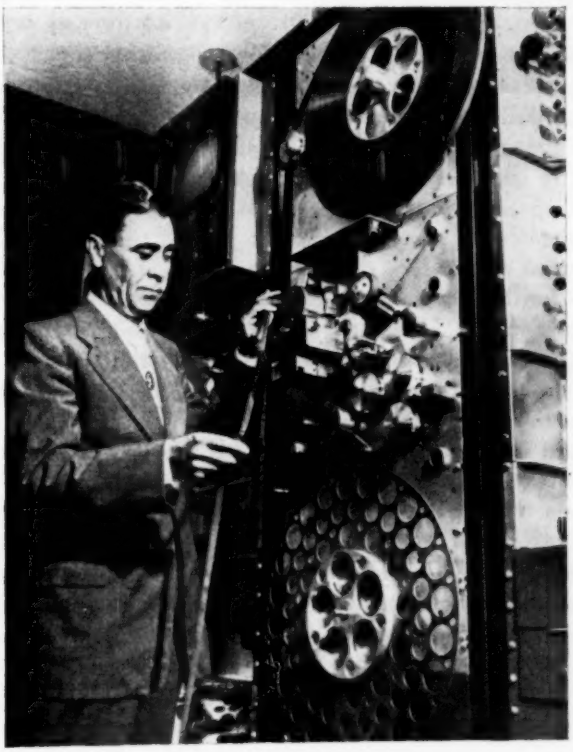

FIGURE 12.

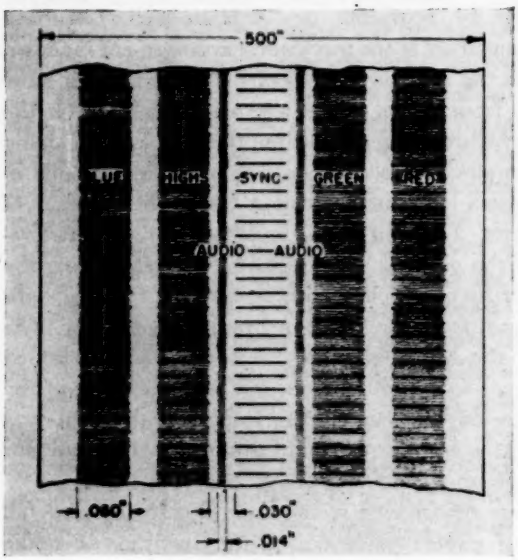

FIGURE 13. *Track layout for colour television recording*

A prototype system designed by R.C.A. to record and reproduce the information contained in the composite colour signals of the United States colour-television standard with tape speed of 240 inches per second is now being field tested. The tape is half an inch wide and carries six separate channels. These are made up of the red, blue and green decoded video signals which are recorded with a bandwidth of 1½ Mc/s in three separate channels. The fourth channel contains the high frequency components of the colour signals extending from 1½ to 3½ Mc/s. The horizontal synchronizing signal is carried by the fifth channel. These video signals are recorded by means of a quintuplet magnetic head. The sixth channel is for sound, which is recorded as a frequency modulation of an appropriate carrier. The layout of the tracks on the tape is shown in Figure 13.

There are, of course, alternative approaches to the problem of economizing on the use of tape, but considerations similar to those outlined above are fundamental in some degree to any system. One method using 5/8 inch wide tape with a tape speed of about 100 inches per second, and with ten tracks, has been demonstrated for the recording of black-and-white television pictures. However, additional difficulties of phase and transient response arise in the process of dividing and recombining the information on to the multiple tracks. The difficulties are considerably greater for colour with this particular method.

Another method has been devised which reduces the tape speed to that commonly used in sound-tape recording. This is achieved by establishing the relative velocity relationship required for the video signals by causing the magnetic heads to move with respect to the tape. A system of this kind was recently demonstrated in Chicago using a two-inch wide tape running at 15 inches per second for black-and-white television pictures. The magnetic pattern is recorded transversely across the tape instead of longitudinally, by an arrangement consisting of four magnetic heads revolving at a rate of about 14,000 revolutions per minute. The relative motion between tape and heads gives an effective tape speed sufficient to record and reproduce up to four Mc/s bandwidth, yet requires only a 14 inch diameter spool for storing sufficient tape for an hour of programme time. Since the tape speed is normal for sound recording, the sound accom-

paniment is conveniently recorded longitudinally along the tape in the usual way. It is claimed that this system will also be applicable to the recording of colour-television signals.

Before leaving the subject of video tape recording, it is appropriate to quote what one of our great leaders has predicted for tape recording systems of the future. David Sarnoff foresees these further possibilities:

> Small portable television cameras already are in wide use in industry, in stores, in banks, in schools and colleges. Eventually a low-cost video recorder of simple and compact design will also become available. In the home the tape equipment could be used for making home movies with a television camera or connected to the television set to record favourite television programme with no need to send away the tape for processing. The continuing development of tape recording holds forth promise of ever wider application as a system of true electronic photography for industry in general and for the home.

It is now time to conclude. The rapid advances in research, particularly as regards materials, are now making it possible for advantage to be taken of the close connection between electronics and the visual arts. Electrofax and video tape recording are new developments still in their infancy. Significant as they are in themselves, their portent of things to come may be even more profound. One can say that in the photographic field each is a first order break through of the chemical barrier. If refreshing contributions to the art and science of photography can come from such diverse fields as electrostatics, the maiden aunt of practical physics, and from magnetostatics, the handmaiden of modern communications, we should indeed hesitate to circumscribe future developments by timid prophecy.

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   'Audio Systems' by J. G. Woodward.

THE CHAIRMAN: It is my pleasure to propose a vote of thanks to Mr. Mayer for his lecture. We can all agree that we have listened to a very fine lecture indeed, clearly and concisely given, for it is a very difficult subject to get across to an audience who may or may not know the background, which the lecturer must, unavoidably, leave unsaid.

He has outlined to us this afternoon a vast field, and I was very interested in the phrase he used in his concluding remarks—'breaking down the chemical barrier by electrical and electronic means'. It is difficult to see where this process is going to lead, but it is obvious that the work his organization has achieved so far has opened up great possibilities for future development.

The output of new scientific knowledge from the research organization of the Radio Corporation of America, which Mr. Mayer represents here to-day, is prodigious.

I recently had the pleasure of a visit to Princeton, their headquarters, and I saw the television recording equipment which Mr. Mayer has described—a really fascinating instrument which will be of great value to television service operators everywhere.

In the other part of his lecture I was not really at home. The great field of the graphic arts is, I fear, unknown to me, but most of us know enough of the background to realize the potentialities of the Electrofax principles of operation. I am sure I speak for all here in saying that we are glad to have had this opportunity of hearing an account of this remarkable work. May I also congratulate Mr. Mayer on the informative way he carried out the demonstrations.

The Radio Corporation of America is always willing to disclose information about new work, and to give technical advice to others working on similar problems. It is, like all big organizations, very public-spirited in this matter, for the benefit of us all, and for a higher standard of living.

I am particularly interested in the contributions which have been made by Mr. Mayer's organization to television. Its fame and reputation is international. A recent achievement of many has been the development of the colour display tube which Mr. Mayer mentioned. By a remarkable process these tubes are now being made in quantity, reducing very considerably the cost of colour television receivers. Mr. Mayer, in his present capacity, has a real responsibility in being the mouthpiece of the research work which is going on in America. I am glad to say in passing that he received much of his engineering training in this country, and we are happy that that was so.

I am sure you would wish me, on behalf of you all, to say how grateful we are to Mr. Mayer for his most interesting lecture; I hope we shall have the pleasure of hearing more from him later on. I would ask you now to convey your thanks in the usual way.

A vote of thanks to the Lecturer was carried with acclamation; and, another having been accorded to the Chairman, the meeting then ended.

GENERAL NOTES

'SIXTY YEARS OF CINEMA' EXHIBITION

Most of us have perhaps rather tended to take for granted, or at any rate too seldom considered, the astonishing advance of the cinema from its earliest shadow-play, such as the trick fantasies devised by the French conjuror, Georges Méliès, to the elaborate, sound-equipped film-making which in our day has become so immensely powerful a medium and industry. The development of the cinema is, indeed, infinitely more stimulating a subject for study and speculation than any single exhibition, devised 'to give fun to people', could possibly be. It is no fault of Mr. Richard Buckle's, then, that, for all his ingenuity, *Sixty Years of Cinema*—presented near the National Gallery, in premises outwardly embellished by Sir Hugh Casson—actually excites one rather less than the Diaghilev Exhibition which Mr. Buckle directed some time ago.

Even so, this film exhibition, sponsored by the *Observer* in association with the British Film Institute and La Cinémathèque Française, has a sufficient quota of artistic conceits, and will certainly draw considerable crowds if only for the sake of the classic films shown twice a day in a cinema on the site. No doubt, by this time, the workmen who were still ubiquitous on the opening day will have vanished, leaving more magical effects in their wake. What will certainly remain are the numerous photographic 'stills', some enlarged, and few of them labelled; and, with

the best will, such material obviously cannot be made as inviting as the original designs for the Russian ballet at Forbes House. At the same time, Mr. Buckle has exercised all his resourcefulness in Hamptons' former premises wherever artists could be suitably employed, so that one's eye is taken by fancies as agreeable as Mr. Osbert Lancaster's *décor* for an animated cartoon room, and Mr. John Piper's baroque Shadow Theatre, with its gilded spiral columns and brooding figures in relief, which forms the climax of the exhibition.

It is an imaginative climax, and its secret is now probably an open one. To approach the theatre, visitors must pass—all unsuspectingly—behind its screen of silvered glass, their forms being silhouetted and their slightest gestures amplified on the screen by a powerful light and distorting mirror. It is only, of course, when one arrives in the theatre, and suddenly perceives the shadow-play of those following behind, that one realizes that one has been a screen actor in those few seconds. It is a prank, but a purposeful one, for indeed the whole exhibition curiously instils a sense that 'Life's but a walking shadow' after all.

The prevailing note of fantasy is struck at the outset in the figures of angels handling film and cameras, all suspended in space, the work of a gifted young sculptress, Miss Astrid Zydower. Presently one finds pictures coming to life through such optical toys as the *Thaumotrope*, *Phenakisticope*, and *Stroboscope*, devised early in the nineteenth century; and in room 4 we attend the birth of the modern cinema, when Edison's experiments had evolved the Kinetoscope (patented in 1891), presently resulting in Lumière's *Cinématographe* giving the first public showings, some sixty years ago, of moving photographic projections. So was the door opened to Méliès, the screen's first artist and creator of *Conquest of the Pole*, and to the cinema's first master, D. W. Griffith, who made his first film in 1905 followed by such silent epics as *Birth of a Nation* and *Intolerance*.

In Europe, in the early years of the century, there was a tendency to film stage performances, those of Sarah Bernhardt, Réjane, and Mounet-Sully, for instance, all being transferred to the French screen. Before long, however, Hollywood had taken the lead, and its procession of stars—at first as silent as the Gishes and Talmadges, and Valentino the Sheik, at length booming indistinctly, and nowadays very articulate indeed—has moved continuously across the globe. No feature of the present exhibition is likely to be more popular than the costumes worn in famous films by Chaplin, Fairbanks, Mary Pickford, Harold Lloyd, and some others, who became household names between the wars.

The exhibition underlines the distinction between the film as art and as commercial entertainment, directs attention to technical developments, and so on; but the paramount impression left on the mind's eye is nevertheless a jumble of inscrutable idols and incidents, resurrected from the past and portrayed in photographic 'stills' that festoon the walls. How much more sinister than pathetic does Chaplin appear, one reflects, in this frozen state; how strangely mindless those 'world's sweethearts' of an earlier generation, with their chalky complexions, expressionless eyes, and innumerable beads; how fatuously melodramatic much else. And even now one wonders if this colossal industry is not essentially a channel of trivialities, in which significant films flow far less freely than they did thirty years ago, when such movements as expressionism, cubism, and surrealism were invading the European cinema and raising it, for a time, to the level of a serious art. Just what effect the growing challenge of television may have on the main direction of the cinema of the future we can still only surmise.

NEVILE WALLIS

DESIGN IN ADVERTISING EXHIBITION

The first Exhibition in London of work by designers and artists who are members of the Alliance Graphique Internationale, was opened on 14th June by M. Jean Carlu, President

of AGI, who was introduced by Mr. Ashley Havinden, President for Great Britain. Following the showing in Paris last year, the Exhibition presents, in an eminently clear display, examples of the work of internationally recognized advertising artists from 11 countries. The Exhibition, at the R.B.A. Galleries, Suffolk Street, Pall Mall, is open daily from 10 a.m. to 7 p.m. on Tuesdays to Fridays, and from 10 a.m. to 5 p.m. on Mondays, until 30th June. An introduction to the Exhibition catalogue, written by Mr. Charles Rosner, is reproduced below by kind permission of the author and of the Alliance Graphique Internationale:

The days of the Renaissance had their craftsmen and artists, typical manifestations of spiritual and material riches. In our day industrial and technical developments have made their mark in the field of communication through advertising, calling for the skilled designer who can work in a functional fashion and achieve a result of the highest artistic level in fulfilment of his complex function. Art and commerce must come to terms with each other, and our mid-twentieth century mentality has found a logical expression in AGI—Alliance Graphique Internationale.

Throughout the ages, artists have always been most independent by nature and even among individuals their independence is the most tenacious of all. Yet, generally speaking, they have no objection to collective membership of a school of painting if it can bring about the recognition of school or trend more effectively than the efforts of a lone individual member. How was it that a number of designers and artists banded together as AGI in spite of the fact that they came from many countries and did not belong to the same school, either nationally or internationally?

They were brought together in the first place by an awareness that their colleagues were faced with the same or similar circumstances or problems, irrespective of country. Six years ago an exhibition of the work of five artists—three French and two Swiss—toured Switzerland, and out of their friendly meeting in 1950 in Basle grew the idea of AGI. A casual, spontaneous but intermittent exchange of problems, experiences and views gradually fell into a recognizable pattern, and it became obvious that they should be brought together within a formal framework to the advantage of all those actively and passively concerned with and interested in design in advertising in its widest expression.

AGI was officially formed in Paris in November, 1952, under the presidency of Jean Picart le Doux. The aim was to improve and foster mutual understanding between leading designers throughout the world, both from the artistic and economic point of view. Much ground has been covered in a short time. For instance, in April, 1955, AGI organized a remarkable international exhibition on a large scale in Paris entitled *Art and Advertising in the World*. Jean Carlu, their current President, said that the Exhibition was not only a remarkable collection of works of graphic art from all the corners of the world. It stressed, above all, the æsthetic affinity uniting the work of AGI across oceans and continents, in spite of different psychological 'climates'. It showed the work of 74 artists, including 22 guest exhibitors; it represented 11 countries, and it was held in the Pavillon de Marsan of the Louvre.

AGI exhibitions are noteworthy as each member-designer has entire independence of choice of exhibit—a way of expression within the framework of a collective expression. Each designer stands for the exhibit of his choice and the group as a whole stands for the level which is created by the cumulative impact of individual exhibitor and exhibit. AGI necessarily limits accession to its ranks through the election of new members by existing members, but it gives full freedom to members once they have been elected.

Here is a free confederation of design on an international scale. What are the benefits to advertisers, to its members and to the world of advertising at large? When the selection of exhibits is his responsibility—and obviously he will display

his most resolved work—the artist can pay a grateful tribute to those of his advertising clients who have given him the opportunity of a free hand to express himself at his best for the sake of the advertiser. The designer can enjoy the benefit of a free and uninhibited interchange of outlook and experience with his colleagues in other countries. As for the benefit to advertising at large, such exhibitions can prove to non-believers that striking results can be attained in present-day advertising art without stepping down from intellectual and artistic levels and execution of high standards. The exhibits are a convincing proof that the visual expression of clear thinking, intellect, and imagination is not restricted to any particular style. Success may be due to the creation or employment of abstract shapes and rhythm of forms, masterly lines of the versatile hand, brushwork worthy of the experienced painter, letter forms worthy of the top-flight typographer, or it may be due to a combination or variation of several such methods. The successful designer must be able to answer two vital questions—the exact purpose of any given piece of advertising communication, and the best way to give it convincing effect.

When exhibitions of this nature are international rather than national the main conclusion is bound to be more conspicuous. The AGI Exhibition in London shows a common pattern. This particular approach to and solution of the complex problems of modern advertising communication are not confined to a few advertisers, or to a few artists, or indeed to a few of either in any given country. The amazing triumph of the AGI Exhibition in the Louvre did not only find expression in laudatory articles in the French and international Press. Not only did advertisers and designers go to see their own work or the work of their competitors, but a surprisingly high number of members of the lay public were interested enough to see the Exhibition and pay an entrance fee, in spite of the fact that many of the exhibits had been on view to the public on hoardings, in newspapers, and in periodicals in many countries.

In those weeks in Paris, the main topic of conversation was not concerned with one exhibitor's merits against another's or with one designer's work compared with another's. It centred excitedly round the fact that advertising at its best had gained the distinction of admission to and acceptance by a museum of applied art with such a great tradition. AGI had passed a formidable test. Museums apply two yardsticks in deciding the fate of potential exhibits: what is their worth from the historical point of view and what is their worth in the present day?

Advertising design—not only the exhibited design, but the actual method of display—found a rightful place among other expressions of contemporary applied art. Significantly the technical execution of multiplication equalled the standards of conception, a vital element in the success of any piece of advertising.

The London Exhibition of AGI, following as it does so closely on the heels of the showing in Paris, will give the English advertiser and the English onlooker—both less emotional than the French—a fair chance to see for themselves whether our designers for advertising are given the same scope as those in foreign parts. If the interest of the English in these exhibits is as rewarding as that of the French, then the question will arise whether those responsible for setting the standards for design in advertising do not underrate the artistic and intellectual receptivity of the English public at large.

RED CROSS LECTURE

A lecture on 'How we hear and how we see' is to be delivered by Sir Lawrence Bragg, O.B.E., M.C., F.R.S., at the Royal Institution, Albermarle Street, London, on Tuesday, 3rd July, 1956, at 8.15 p.m. The lecture, which will be illustrated by experimental demonstrations, is in aid of the British Red Cross Society, County of London Branch, and admission will be by ticket only. Tickets, at £1 1*s*. 0*d*., 15*s*., 10*s*. 6*d*., and 6*s*. 6*d*., should be obtained in advance from: The Branch Officer for Appeals, County of London Branch, B.R.C.S., 6 Grosvenor Gardens, S.W.1.

OBITUARY

THE RIGHT HONBLE. LORD PERRY

We record with regret the death, in the Bahamas on 17th June, of Lord Perry, at the age of 78.

The Right Honble. Sir Percival Lea Dewhurst Perry, Baron Perry of Stock Harvard, in the County of Essex, K.B.E., LL.D., F.R.G.S., M.I.Mech.E., was educated at King Edward School, Birmingham. After a short time in a lawyer's office, he moved to London, where he entered the motor trade, and was instrumental in introducing the Ford car into this country at the beginning of the century.

A visit to the United States, and meeting with Henry Ford, led him to form the Ford Motor Co. (England) Ltd., in 1909. In 1928 he handled the reorganization of the Ford European interests, this resulting in the formation of the present Company, and the building of the Dagenham factory. He was Chairman of the Company until his retirement in 1948, and also held that position in the Ford Motor Companies of a number of other European countries. He was also a director of the National Provincial Bank Ltd., and from 1914 to 1916 president of the Motor Trade Association. Among other businesses founded by him was the Slough Estates, organized in 1920. The wartime Slough depot was thus converted into a prosperous industrial estate.

During the First World War he worked voluntarily in various government departments, employing his own staff. At the outbreak of the Second World War he became business adviser to the Ministry of Food, resigning in 1940. Interested in farming and in the arts, he founded the Fordson farms, an experiment in co-operative farming, and published several books, among them *International Trade Balance*, and a volume of poetry, *O.K. Verses*.

He was appointed C.B.E. in 1917, and created K.B.E. in the following year, being raised to the peerage in 1938. He also received many foreign honours. Lord Perry was elected a Life Fellow of the Society in 1947.

SIR FRANK BRANGWYN

We also record with regret the death, in Sussex on 11th June, of Sir Frank Brangwyn, an Albert Medallist of the Society.

Frank William Brangwyn, R.A., R.P.E., Hon.R.S.A., LL.D., University of Wales, was born in Bruges in 1867. Brangwyn's early years were spent in Belgium, but on the family's return to England he worked at the Victoria and Albert Museum, and at the age of 15 was brought to the notice of William Morris, who employed him on making cartoons for textiles. In 1885 Brangwyn's first painting *A Bit of the Esk* was exhibited at the Royal Academy. The sale of the picture encouraged him to leave his work in London, and he went to sea as a cabin boy; his subsequent travels had a considerable influence on his style.

Yet, although Brangwyn continued to paint easel pictures, and to exhibit at the Academy, he early developed along the lines by which he is best known, that of mural painting; and of his murals those originally commissioned for the Royal Gallery of the House of Lords in 1925, and now in the Brangwyn Hall at Swansea, first made his name widely known. His murals were commissioned for many London buildings, and examples of his work are to be found all over the world. Some of his largest murals are in the United States, Canada, and Mexico, while Bruges, and Orange in France, have Brangwyn Museums.

Brangwyn was an extraordinarily versatile artist. Apart from his mural painting, he practised most of the visual arts and crafts from architecture to book illustrations.

He designed the British Pavilion used for the Biennial Exhibitions in Venice, and the *façade* of the Rowley Gallery in Kensington. In 1930 a comprehensive exhibition of his furniture, pottery, carpets and interior decorations was held in London, while in 1935 was published *The Way of the Cross*, an interpretation in 12 drawings of the Stations of the Cross, with a commentary by G. K. Chesterton. In 1952 he became the first living artist whose works were chosen for a retrospective exhibition in the Diploma Gallery of the Royal Academy, and a note on this, by Mr. Nevile Wallis, was published on page 831 of the *Journal* for 31st October, 1952.

In 1932 the Albert Medal was awarded to Brangwyn 'for services to decorative and commercial art', and in the letter which accompanies the medal the Duke of Connaught, then President of the Society, said 'your mural paintings adorn many of our great buildings . . .; your numerous etchings of industrial subjects have marked you out as one of the greatest etchers of our time; you have distinguished yourself as a designer of furniture, posters and stained glass windows, and numerous as are the branches of art which you have practised, you have proved yourself a master in every one of them'.

Brangwyn was knighted in 1941. Among his many positions were the Presidency of the Graphic Arts Society and the Vice-Presidency of the Association of Architects and Surveyors. He also received numerous foreign honours.

DR. J. M. COPLANS

We also record with regret the death, in Cape Town recently, of Dr. J. M. Coplans, who was drowned while bathing.

Joseph Moses Coplans, L.R.C.P., L.R.C.S.Ed., was born in Canterbury in 1888. He was educated at Simon Langton School, and served as a captain in the R.A.M.C. during the First World War. Later, he was director of dental services at the King Albert War Hospitals, and senior honorary surgeon to the Dental Hospital at Johannesburg.

Dr. Coplans was also a sculptor, and his bust of Bernard Shaw is now in the British Museum, while others of his works are in the National Gallery of Ireland, the Togg Museum at Harvard, and the Kruger Museum, Pretoria. He also contributed a series of cartoons to the *Jewish Chronicle*.

He was elected a Fellow of the Society in 1951.

NOTES ON BOOKS

THE ENGLISH HOME. *By Doreen Yarwood. Batsford,* 1956. 45*s*

Mrs. Yarwood is to be congratulated upon the admirable idea behind this impressive history of the English domestic interior and upon the tremendous amount of work that has gone to its fulfilment. The idea is to classify, explain and illustrate the furniture, the equipment and the details appropriate to each of ten main periods, beginning in the seventh century with Anglo-Saxon and ending in 1914 with Edwardian and, on the basis of these components, to reconstruct in drawings complete rooms of each period.

The great majority—indeed 731—of the illustrations are line drawings. Mrs. Yarwood makes it clear that this concentration on drawings, at least as far as the complete rooms are concerned, is an essential part of her conception of the book; for only in a drawing can she be certain of showing an interior entirely of one period. No doubt this is true enough, but there is a certain inhumanity about any ordinary room which is all of a piece, which has inherited nothing from its past—I say 'ordinary room', because I am sure that this does not apply to the classic and disciplined

splendour of, for instance, Syon House. I find the line drawings in this book rather hard and unsympathetic; they provide an adequate presentation of individual pieces of furniture but fail to give an impression of the character and atmosphere of a room; indeed, they emphasize the essential inhumanity of a one period interior. Incidentally it would have made the book a great deal more useful as a work of reference if the source of the illustrations had been given.

It is perhaps unfortunate to end a history of domestic interiors at so desperate a moment as 1914; after all, some fine new rooms were produced in the 1930s, and one or two of these could have left readers with a ray of hope for the future.

But in spite of these criticisms this is not only, as Mrs. Yarwood intended it to be, a useful work of reference for students; it is also of great interest for the general reader.

R. D. RUSSELL

FROM THE JOURNAL OF 1856

VOLUME IV. *27th June*, 1856

THE SOCIETY'S FIRST EXAMINATIONS

From the Report of the Fifth Annual Conference of Institutions in Union.

It will be remembered that one of the objects laid down on the original formation of the Union in 1852 was, 'that the Institutions be assisted to become also places of systematic instruction, with systematic examinations, and certificates of the results of studies'. This the Society has endeavoured to carry out by establishing a system of Examinations. The first Examination was held in the Society's rooms on the 10th, 11th, 12th and 13th of this present month of June, under the direction of an acting Board of Examiners* consisting of the following gentlemen:—

Mr. Ball, Mr. John Bell, Dr. Bernays, Rev. Dr. Booth, F.R.S., Professor Brasseur, Professor Brewer, Mr. C. Brooke, M.A., F.R.S., Professor Browne, Mr. James Caird, Dr. W. B. Carpenter, F.R.S., Mr. F. S. Cary, Rev. S. Clark, Rev. Dr. Elder, Rev. W. Elliot, Mr. Glaisher, F.R.S., Professor Henfrey, F.R.S., the Dean of Hereford, Mr. G. H. Jay, Dr. Bence Jones, F.R.S., Mr. J. C. Morton, Rev. A. Bath Powers, M.A., Mr. F. R. Sandford, Professor Solly, F.R.S., Dr. Stenhouse, F.R.S., Rev. F. Temple, Professor John Wilson, F.R.S.E.

There were 52 Candidates. The subjects in which the Examination was held were as follows:—Mathematics, Book-keeping, Mechanics, Chemistry, Physiology, Botany, Agriculture, Geography, English History, English Literature (including English Composition and Writing from dictation), Roman History and Latin, French, German and Free-hand Drawing in outline from objects.

All the Candidates were tested by a preliminary examination in writing and spelling, and unless this examination was satisfactorily passed the candidates were not allowed to attend the other sections of the Examination. Of the 52 Candidates only two were rejected on this head. The Examiners have been much gratified to find that in the greater portion of the subjects the general standard of information disclosed is higher than had been anticipated. The Society's certificates are of three grades: the first for 'Excellence', the second for 'Proficiency', and the third for 'competency'. The details, however, of the examinations, will be given in the Examiners' Report.

* who gave their services voluntarily and examined all the candidates orally [Ed.]

LIBRARY ADDITIONS

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